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NATIONAL DAM INSPECTION PROGRAM. MAUCH CHUNK LAKE DAM (PA00605)--ETC(U)
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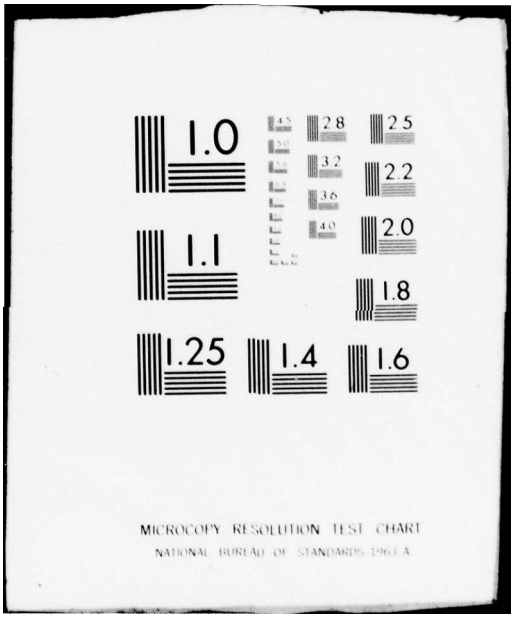
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MAUCH CHUNK LAKE DAM

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

SEPTEMBER 1978

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DELAWARE RIVER BASIN

MAUCH CHUNK LAKE DAM
CARBON COUNTY, PENNSYLVANIA
NATIONAL I.D. NO. PA 00605

(6) National Dam Inspection Program. Mauch Chunk Lake Dam (PA00605), Delaware River Basin, Mauch Chunk Creek, Carbon County, Pennsylvania. Phase 1 Inspection Report.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

(15) DACW31-78-C-0048

Prepared by:

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5120 Butler Pike
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Submitted to:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

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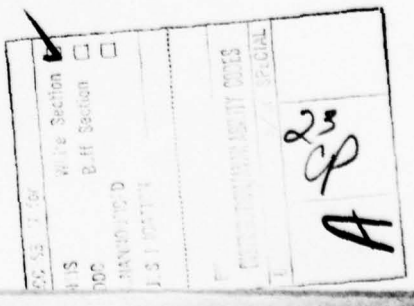
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam: Mauch Chunk Creek Dam
County Located: Carbon County
State Located: Pennsylvania
Stream: Mauch Chunk Creek
Coordinates: Latitude 40° 51.9' Longitude 75° 47.3'
Date of Inspection: 17 August 1978

Mauch Chunk Creek Dam is owned by Carbon County and maintained by the employees of Mauch Chunk Lake Park. The dam was designed by the United States Department of Agriculture, Soil Conservation Service, in 1967. The facility is considered to be in good condition and well maintained. The dam is classified as a "High" hazard dam consistent with the potential for extensive property damage and loss of life downstream in Jim Thorpe, Pennsylvania. The dam is also classified as an "Intermediate" size dam based on its 50 foot height and 4,169 acre-feet normal storage capacity.

Hydrological and hydraulic calculations associated with this dam and reservoir were obtained from Department of Environmental Resources files and the Soil Conservation Service, and a review of these results indicate that the dam would not be overtopped during the passing of the probable maximum flood (PMF). Therefore, the spillway systems are considered to be "Adequate". Although the dam is capable of passing the PMF storm, the Soil Conservation Service estimated that when discharge from the dam exceeds 207 cfs and is combined with the discharge from the intervening area between the dam and Jim Thorpe, out-of-bank-flows would occur in Jim Thorpe resulting in damage to the town.

The visual observations did not indicate any existing embankment stability problems. The riprap on the upstream slope is in good condition as is the Crownvetch on the downstream slope. Dam alignment, the emergency spillway and the accessable portions of the principal spillway were also found to be in good condition.



Several seepage zones were noted beyond the downstream toe of the embankment. However, discussions with Park Representatives and a review of the records indicates that these springs were noted before construction and that the dam was relocated 125 feet upstream to avoid this seepage. These conditions are not considered to be of major concern, but they should be monitored for changes in flow rates or turbidity.

As the dam is judged to be in good condition, the recommendations presented below are suggested to insure that the dam continues to function as designed and to insure that residents downstream are notified when impending high flows are expected along the creek. These recommendations are presented in order of priority, but does not infer that the latter recommendations are not important.

1. The marshy areas located to the left of the principal spillway discharge channel should be graded and drained. Discharge should be periodically collected and checked for changes in flow rates or in turbidity.

2. The marshy area designated by an area of dead trees downstream of the principal spillway should be monitored periodically for unusual changes in seepage. Considering the extent of this area, it is impractical to collect the water and check for flow rates. However, the area should be checked for concentrated flows and unusual changes in seepage rates which may lead to piping.

3. The riprap channel immediately below the principal spillway impact basin should be monitored after any significant discharge passes through the channel. As necessary, the principal spillway discharge channel should be rehabilitated to insure that it operates properly in time of need.

4. Periodic checks of the emergency spillway should be performed and the woody vegetation removed before it effects the discharge capacity.

Recommendations concerning the operation and maintenance of the dam are as follows.

1. Because the dam is located upstream of a highly populated area, Jim Thorpe, Pennsylvania, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. These procedures should include methods of warning downstream residents that high flows are to be expected; and, if necessary, procedures for evacuating residents along the creek in Jim Thorpe.

2. The Owner should develop an inspection checklist as an amendment to the current maintenance procedure to insure that all critical items are inspected and maintained on a regular and periodic basis.

John H. Frederick, Jr., P.E.
Maryland Registration 7301
Woodward-Clyde Consultants

9/22/78
Date

W S Gardner

William S. Gardner, P.E.
Pennsylvania Registration 4302E
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9/22/78
Date

APPROVED BY:

G. K. WITHERS
Colonel, Corps of Engineers
District Engineer

28 Sep 78
Date

OVERVIEW
MAUCH CHUNK CREEK DAM, CARBON COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
MAUCH CHUNK CREEK DAM
NATIONAL ID #PA 00605
DER #13-106

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Mauch Chunk Creek Dam is a 50-foot high rolled earth dam, 1,710 feet long and impounds a 320 acre reservoir. The dam was constructed with local borrow materials and contains one primary material zone with a secondary zone concentrated around the discharge pipes. The primary zone, Zone 2, consists of clayey silty sands and sandy silts classified by the Unified Classification System as SC-SM and SM or ML. Zone 1 materials, classified as low plastic silts (ML), are located around the pond drain and principal spillway discharge pipes, and were placed to minimize seepage along the length of the pipe.

The dam contains a rectangular drainage trench, ~~shown on Plate 3,~~ located downstream from the centerline. The embankment also contains a cutoff trench under the centerline of the dam.

The upstream slope was constructed to 2.9H:1V with an 8-foot wide bench at elevation 1007.7. The crest is 17 feet wide at elevation 1019.8. The upstream slope is protected with riprap between elevations 1014.7 and the bench. The 18-inch thick riprap overlies a 6-inch thick filter bed. The downstream slope was constructed to 1.93H:1V, and is grass/Crownvetch covered.

ABSTRACT

Water is normally discharged through the principal spillway. The intake riser is located within the embankment, approximately 51 feet upstream of the centerline. Water overflows the riser weirs (elevation 1009.7) and discharges through a 36-inch I.D. reinforced concrete pipe which extends under the dam and discharges into an impact basin at the downstream toe. A 24-inch I.D. reinforced concrete pond drain conduit extends from the base of the riser to the reservoir. The pond drain discharge, controlled by a sluice gate in the riser, flows through the principal spillway pipe. The sluice gate contains a 2-5/8-inch orifice which discharges water at a rate of not less than 0.9 cubic feet per second to maintain minimum flow requirements in Mauch Chunk Creek. The riser also contains a gated 8-inch orifice 18 inches below normal pool for municipal water supply purposes.

During severe storms, excess water can also be discharged over the emergency spillway at the left abutment. The spillway crest elevation is 1013.7.

b. Location. The dam is located on Mauch Chunk Creek in Mauch Chunk Township, Carbon County, Pennsylvania. The dam site is 3 miles west of the confluence of Mauch Chunk Creek with the Lehigh River. The dam site and reservoir are shown on USGS Quadrangle entitled, "Nesquehoning, Pennsylvania", at coordinates N 40° 51.9', W 75° 47.3'. A regional location plan of Mauch Chunk Creek Dam and reservoir is enclosed as Plate 1, Appendix E.

c. Size Classification. The dam is classified as an "Intermediate" size structure by virtue of its 50-foot maximum height and 4,169 acre-foot normal storage capacity.

d. Hazard Classification. A "High" hazard classification is assigned consistent with the potential for extensive property damage and loss of life downstream in Jim Thorpe, Pennsylvania.

e. Ownership. Mauch Chunk Creek Dam is owned by Carbon County and maintained by Mauch Chunk Lake Park representatives. The water supply system is maintained by the County Municipal Authority. All correspondence should be sent to Mr. Dennis DeMara, Park Director, Mauch Chunk Lake Park, 529 Lentz Trail, Jim Thorpe, Pennsylvania 18229.

f. Purpose of Dam. The purpose of this dam is for flood control, recreation and water supply.

g. Design and Construction History. The dam was designed by the United States Department of Agriculture, Soil Conservation Service, in 1967. The application to construct Mauch Chunk Creek Dam was submitted on 26 February 1968, and the "Report Upon the Application of the Commissioners of Carbon County" was issued by the State of Pennsylvania on 2 May 1968, by Mr. Joseph J. Ellam, Hydraulic Engineer for the Department of Environmental Resources. The Permit to construct the dam was issued on 11 January 1968. Records indicate that construction by Feeser Construction Company began in June 1969, and during the summer and fall of 1969 work was limited to predominantly foundation preparation and grouting operations. All grouting was performed by Layne Company of New York during the summer of 1969. During the summer of 1970, earthworks were well underway and fill was being placed at an average rate of 5,000 cubic yards per day.

By 1 May 1971, the construction was approximately 85 percent complete when the Operator's Union went on strike. This strike lasted until the end of June 1971, during which time there was no work performed on the dam. In July

1971, operations resumed and a final inspection of the dam was made by State of Pennsylvania representatives on 29 October 1971. The dam and appurtenant structures were officially completed on 19 November 1971. According to park representatives, all construction, including the seeding of slopes, was completed 30 days before Tropical Storm Agnes (June 1972). This storm filled the reservoir.

h. Normal Operating Procedures. Reservoir outflow is controlled by the principal and emergency spillways. Under normal conditions, water flows over the two 9-foot long riser weirs and drops to the base of the riser discharging through a 36-inch reinforced concrete pipe into an impact basin at the downstream toe. The required minimum flow release is through a 2-5/8 inch diameter hole in the pond drain sluice gate at the base of the riser.

Excess water is stored up to the spillway elevation of 1013.7. Thereafter, water is discharged over the emergency spillway located at the left abutment.

The reservoir can be lowered or drained by opening the sluice gate from the top of the riser to allow water to pass through the 24-inch I.D. reinforced concrete pipe at the base of the dam. This water discharges into the 36-inch principal spillway conduit and then into the impact basin.

1.3 Pertinent Data.

A summary of the pertinent data for Mauch Chunk Creek Dam is presented as follows.

a.	Drainage Area (sq. miles)	5.95
b.	Discharge at Dam Site (cfs)	
	Maximum Known Flood (June 1972)	Filled reservoir (no discharge)

Maximum Design Discharge	5,610
Maximum Discharge at Top of Dam	10,533
Minimum Required Flow	0.9

c. Elevation (feet above MSL)

Top of Dam	1019.8
Design High Water	
Emergency Spillway Crest	1013.7
Principal Spillway Crest	1009.7
Pond Drain Entrance Invert	970.2
Riser Floor Elevation	969.7
Discharge Conduit Exit Invert	967.0
Water Supply Orifice	1008.5

d. Reservoir (miles)

Length at Normal Pool	2.7
Fetch at Normal Pool	2.7

e. Storage (acre-feet)

Normal Pool	4,169
Design Maximum Flood	5,763
Top of Dam	8,300

f. Reservoir Surface Area (acres)

Normal Pool	320

g. Dam Data

Type	Rolled earth with drain trench
Length	1,710 feet
Height	50 feet
Crest Width	17 feet
Volume	283,000 cubic yards
Freeboard at Normal Pool	10.1 feet

Side Slopes	
Upstream	2.9H:1V with 8-foot bench at elevation 1007.7.
Downstream	1.93H:1V
Riprap (upstream)	Elev. 1014.7 to elev. 1007.7.
Cutoff	Cutoff trench below centerline.
Grout Curtain	Yes. Triple line curtain; 5 ft. staggered spacing; split spaced technique.

h. Diversion — Initial diversion by channeling and then via pipe at base of dam.

i. Outlet Works

Principal Spillway	
Type	Standard Soil Conservation Service riser.
Discharge	36-inch RCP; 150 foot long into impact basin.
Emergency Spillway	
Type	Channel excavated into decomposed rock.
Location	Left abutment
Width	246 feet
Approach Slope	0.1% and 2.0%
Discharge Slope	3.2%
Control Section	30 feet wide
Channel Side Slopes	Slightly less than 3H:1V.
Pond Drain	
Type	Concrete pipe at base of dam to riser structure.
Pipe Length	100 feet
Pipe Diameter	24 inches

SECTION 2
ENGINEERING DATA

2.1 Design.

A summary of engineering data for Mauch Chunk Creek Dam is presented in the checklist attached as Appendix A. Principal documents containing pertinent data used for this report are as follows.

1. "Report Upon the Application of the Commissioners of Carbon County", by Joseph J. Ellam, Hydraulic Engineer, Department of Environmental Resources (DER), dated 2 May 1968.

2. "Design Report, Site PA-462, Pennsylvania", prepared by the U.S. Department of Agriculture, Soil Conservation Service (SCS). This design report contains such items as the hydrologic and hydraulic design calculations, foundation and embankment design, soil investigation data, soil testing and analysis, and the structural design calculations for the dam and appurtenant structures, and complete set of specifications.

3. "Permit" prepared by the Commonwealth of Pennsylvania, Department of Environmental Resources, dated 11 June 1968.

4. A 25-page set of drawings prepared by the U.S. Department of Agriculture, Soil Conservation Service, Job #PA-462-P, dated 1967.

5. Miscellaneous letters, correspondence, memos, including construction progress reports located in the DER files in Harrisburg, Pennsylvania, and in the SCS files in Mechanicsburg, Pennsylvania.

The available data was comprehensive and included a complete design analysis for the dam and appurtenant structures. In addition, County Park files contained a set of as-built drawings, which were compared to the preliminary drawings in DER files. There were no differences observed between the two sets of drawings. Selected portions of these drawings are included in Appendix E of this report.

b. Design Features. The principal design features are illustrated on the plan, profile and cross-section plates of the embankment and appurtenant structures that are enclosed in Appendix E as Plates 2 through 10. These plates are reproduced from the design drawings which were compared with the as-built plans reviewed at the County Park office. A detailed description of the design features is presented in Section 1.2, "Description of Project", and elaborated upon as follows.

The dam is a rolled earth embankment containing a cutoff trench and drainage trench. The drainage trench has a rectangular cross-section and is located downstream of the centerline. Plates 3 and 4 show the location of this trench. The purpose of the trench is to control embankment seepage. The water is discharged through two 6-inch diameter pipes into the impact basin at the downstream toe. The dam also contains a cutoff trench located under the centerline and a triple line grout curtain between Stations 9 + 50 and 13 + 70. Details of the grout curtain are shown on Plate 10 of Appendix E. The split spacing, stage grouting method was utilized where the upstream and downstream holes were drilled and grouted first. Holes were staggered 5 feet on center, and occasionally, the grout hole spacing was reduced to 2-1/2 feet on center.

The upstream embankment slope is 2.9H:1V, with an 8-foot bench at elevation 1007.7. Riprap extends from the bench to elevation 1014.7. The riprap is 18 inches thick and is underlain by a 6-inch thick filler bedding. The downstream embankment slope is 1.93H:1V from the crest to the toe. The crest is 17 feet wide and serves as a roadway for Park personnel. Design features of the spillway systems are discussed in Sections 1.2 and 5.

2.2 Construction.

A description of the construction history is presented in Section 1.2. Construction was performed under the supervision of Mr. John Mickley, Project Engineer for the Soil Conservation Service. SCS inspectors included Mssrs. Henry Hurett, Russell Campbell, and Austin Blakeslee. Mr. Feeser, of the Feeser Construction Company, supervised all construction, except for the grouting which was performed by Layne of New York.

2.3 Operation Data.

The construction permit and the "Report Upon the Application" require the discharge system to maintain a minimum flow of 0.9 cfs, equivalent to 581,400 gallons per day, unless reservoir inflow is less than 0.9 cfs. If reservoir inflow is measured, the discharge may be reduced accordingly. A 2-5/8 inch orifice through the pond drain sluice gate releases the minimum required flow.

Since the dam was designed to operate without the use of a dam tender, there are no operational records maintained at the site. The emergency spillway has never been used.

2.4 Evaluation.

a. Availability. All engineering data reproduced in this report and studied for this investigation were provided by DER, SCS, and Mauch Chunk Lake Park representatives.

b. Adequacy. The design data provided was comprehensive and well documented. Construction data was adequate to evaluate the construction history. In summary, the data obtained is considered adequate to evaluate the dam and appurtenant structures.

c. Validity. There is no reason to question the validity of the data.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The observations and comments of the field inspection team are contained in the checklist enclosed herein as Appendix B, and are summarized and evaluated as follows. In general, the appearance of the facility indicates that the dam and its appurtenances were properly constructed, are well maintained and in good condition.

b. Dam. During the visual survey, there were no indications or evidence observed of distortions in alignment or grade that would be indicative of movement of the embankment or the foundations. There were no surface cracks, sloughing, erosion or misalignment observed. The riprap was in very good condition and stable. There was no noticable seepage observed along the downstream toe or through the embankment. However, seepage zones were noted, as shown on Sheet 5a of Appendix B. These seepage zones were noted during the foundation investigation and during the grouting operations. It is noted that Park representatives indicated that the dam was relocated approximately 125 feet upstream because of the seepage noted during the foundation investigation phase.

Since the filling of the reservoir, a wet zone has emerged approximately 300 feet downstream from the impact basin. This zone, as shown on Sheet 5a, is delineated by an area of dead trees. Original geologic and soils investigation disclosed the flood plain to be a swamp and there were many springs on the abutments. Field permeability tests in test holes on the left side of the flood plain indicated permeability rates in the range of 60 feet per day through highly fractured and jointed sandstone. Therefore, this seepage and marshy area could have developed as a result of the hydrostatic forces from the reservoir. Park personnel reported that the marshy zones located to the left of the discharge basin have remained unchanged since construction.

The two drain outlets located on either side of the impact basin were functioning and clear water was flowing. There were no external indications inferring that internal drainage systems were not functioning as designed.

c. Appurtenant Structures.

1. Principal Spillway. The exposed portions of the principal spillway are in excellent condition, with no signs of cracked or spalled concrete. All gates were exercised and appeared to be in good condition. The gate valves for both the pond drain and water supply pipes were painted, clean and well lubricated. An operations and maintenance manual is located in the Park Office files. The pond drain valve was manufactured by Armco, Model 22505A.

2. Emergency Spillway. The emergency spillway was observed to be in good condition, being excavated into erosion resistant materials and grass lined. There were no signs of significant erosion, channel deterioration, or other evidence that would indicate that the spillway would not function as designed. The vegetation was lush and it appears that the spillway is well maintained. A check of the spillway width indicated it to be 246 feet wide instead of the 250-foot design width (see Section 5).

d. Reservoir. Reconnaissance of the reservoir disclosed no evidence of significant siltation, slope instability, or other features that would significantly affect the flood storage capacity of the reservoir. All slopes are well vegetated, and in some cases trees are growing to the water's edge. The drainage area surrounding the reservoir was also inspected. In general, the drainage basin is well vegetated, contains wooded areas and farmlands. There is little industry. The upper elevations of the drainage were once stripped for coal.

e. Downstream Channel. Immediately downstream of the impact basin, Mauch Chunk Creek Dam discharges water into a riprap-lined channel. There is no

evidence of major erosion or slope instability of the channel. The channel is lined for a distance of approximately 50 feet prior to discharging into the natural streambed.

The emergency spillway discharges about 200 feet below the downstream toe of the dam. The stream bank and channel are stable and well vegetated.

The flood plain below the dam is a swamp, unchanged from the original geologic and soils investigation report. The flood plain is approximately 200 feet wide. The channel banks are roughly 2 feet high, with side slopes ranging from near vertical to 1:1. Further downstream, Mauch Chunk Creek flows through the town of Jim Thorpe, which would be flooded in the event of high flows or failure of the dam. Photograph 14 of Appendix D shows a typical view of the Mauch Chunk Creek through Jim Thorpe, Pennsylvania.

3.2 Evaluation.

In summary, the visual survey of the dam disclosed no evidence of apparent past or present movements to indicate instability of the dam. The wet areas located left of the principal spillway discharge channel were reportedly there prior to construction and during the grouting operations. Since then, Park personnel indicated that there has been very little or no noticable change in the size of these marshy areas. The exposed portions of the principal spillway and the emergency spillway were inspected and observed to be in good condition. It is noted that the inside of the riser could not be inspected, nor could the 36-inch discharge pipe or the pond drain pipe. It is reported by Park personnel that the principal spillway trash racks are cleaned each spring. It is also noted that the valve is exercised two times per year, at which time the valves are cleaned and lubricated.

SECTION 4
OPERATION PROCEDURES

4.1 Procedures.

Normal operating procedures do not require a dam tender. The normal water level is maintained by two 9-foot long parallel weirs at the top of the intake riser. In the event of high flows, excess water is stored to the crest of the emergency spillway. Thereafter, water is also discharged through the emergency spillway into Mauch Chunk Creek.

The intake riser contains one 24-inch pond drain sluice gate at the base of the riser, elevation 970.2. Minimum flow is provided by a 2-5/8 inch diameter orifice located in the pond drain sluice gate. Water passing through the orifice flows through the principal spillway conduit and discharges into the impact basin.

Access to the intake tower riser structure is achieved by a manhole at the top of the tower.There is also an 8-inch gate in the riser located 18 inches below normal pool to supply water for municipal purposes.

4.2 Maintenance of the Dam.

The dam is maintained by the Mauch Chunk Creek State Park representatives, and is periodically inspected by the State of Pennsylvania and the Soil Conservation Service.

4.3 Maintenance of Operating Facilities. Maintenance of the operating facilities is performed by the Mauch Chunk Creek State Park representatives. However, the dam is relatively new, in good condition, with little maintenance having been

required since its completion. During the inspection, an operations manual was found in the Park office and reviewed by the inspection team. This manual contained all of the essential guidelines necessary to operate, repair and rehabilitate the control systems within the control tower.

4.4 Warning Systems in Effect.

There are no formal warning systems or procedures established to be followed during periods of exceedingly heavy rainfall. However, the Park office overlooks the dam and the Park Director lives at the office and can observe the dam during periods of high flow. The Park Director indicated that in the event that an emergency condition develops, the County Civil Defense Authority would be notified and residents of Jim Thorpe would be notified by the Civil Defense Department, the Police, or the fire department.

4.5 Evaluation.

The procedures used by the Park Director for inspecting the dam are adequate and the fact that a representative familiar with the dam and operation of the dam lives immediately adjacent to the emergency spillway helps to insure that the discharge during periods of extreme runoff can be observed and monitored.

Since a formal warning procedure does not exist, a procedure should be developed and implemented during periods of extreme rainfall. This procedure should consist of a detailed method of notifying residents downstream, particularly in the town of Jim Thorpe, Pennsylvania.

SECTION 5
HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. Most calculations for the hydrologic/hydraulic design of this structure are in the design report in the State files. The flood routing was obtained from the Soil Conservation Service (SCS) State office in Harrisburg, Pennsylvania. The watershed is approximately 8.5 miles long and averages 1.3 miles wide with a total area of 5.95 square miles. Elevations range from 1600 feet in the upper reaches to 1009.7 at normal pool elevation. The stream gradient varies from less than 1 percent in the upper reaches to 3 percent in Jim Thorpe, Pennsylvania. The watershed is approximately 80 percent wooded, about 5 percent residential, and the rest open/farmland. Inactive strip mining operations cover approximately 100 acres on the northwestern edge of the watershed in the vicinity of Summit Hill, Pennsylvania. Some new residential construction is taking place in the vicinity of the park, but it is not expected to significantly alter the watershed runoff characteristics in the foreseeable future.

In accordance with the criteria established by the Federal (OCE) Guidelines, the recommended spillway design flood for this "Intermediate" size dam and "High" hazard potential classification, is a probable maximum flood (PMF). A review of the SCS design report indicates that the dam was designed to pass the probable maximum flood (PMF).

b. Experience Data. No rainfall records or reservoir water level records are kept. The dam was completed in November 1971, and the reservoir was filled during Tropical Storm Agnes, June 1972. Tropical Storm Agnes is frequently the storm of record in eastern Pennsylvania. It is estimated from Weather Service publications that between 7 and 8 inches of rain fell in two days over this area.

c. Visual Observations. On the date of the inspection, there were no conditions observed that would indicate that the outlet capacity would be reduced during a flood occurrence. It was noted that the emergency spillway measured 246 feet wide instead of the 250-foot designed width. As shown on Sheet 10, Appendix C, the change in the discharge capacity of the emergency spillway as a result of this reduced channel width is insignificant. Observations regarding the condition of the downstream channel, spillway conditions, and reservoir are located in Appendix D.

d. Overtopping Potential. This dam was designed to contain the PMF without overtopping. The spillway capacity with the reservoir water level at the top of the dam is 10,533 cfs, which is sufficient with storage to pass the calculated PMF inflow of 21,733 cfs. Calculations and flood routing were reviewed and are judged to be adequate.

e. Spillway Adequacy. As the dam does not overtop during the passing of the PMF storm, the spillway systems are considered to be "Adequate". The tailwater is estimated to be approximately 45 feet below the top of the dam during the passing of the PMF event.

f. Downstream Conditions. The primary purpose of Mauch Chunk Creek Dam is to provide flood protection to the town of Jim Thorpe, Pennsylvania, located approximately 3.5 miles downstream. Mauch Chunk Creek enters an underground channel near the western edge of the town (see Photograph No. 14). From that point, the creek flows a distance of approximately 4,500 feet through Jim Thorpe through a combination of channels and culverts until it joins the Lehigh River.

The Soil Conservation Service estimated when discharge from the dam exceeds 207 cfs, and combined with discharge from the intervening area between the dam and Jim Thorpe, out-of-bank flows would occur in Jim Thorpe, resulting in damage. The work plan for Mauch Chunk Creek Watershed, prepared by SCS, estimated that a storm of 7 inches of rainfall, approximately the rainfall produced by Tropical Storm Agnes, over two days would damage over 200 homes and 37 businesses, causing at least a half million dollars worth of damage. Therefore, a "High" hazard classification is justified.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. The visual observations did not indicate any existing embankment stability problems. The riprap on the upstream slope was quite stable and is in good condition. Similarly, the Crownvetch on the downstream slope was thick and evenly distributed over the embankment slope. There are no exterior signs indicating that internal drainage systems were not operating as designed.

As discussed in Appendix B and in Section 3, marshy zones were noted on the left side of the principal spillway discharge channel, and further downstream along the channel. Discussions with Park representatives and a review of the records indicate that these seepage zones were noted before construction and that the dam was relocated 125 feet upstream to avoid the seepage. Although the reports indicate that these zones existed before construction of the dam, it is not known if the flow rates have increased since the reservoir has filled. The water should be collected and monitored for changes in rates or in turbidity.

Further downstream, a zone of dead trees was noted. See sheet 5a of 11, Appendix B. The surrounding ground is marshy and presently contains some cattails. It is assessed, based on the visual inspection, construction photographs, and discussions with Park representatives, that this zone probably developed since filling of the reservoir. Therefore, this area should be carefully monitored for changes in flow rates or turbidity.

The principal spillway and appurtenant facilities within the structure were inspected and evaluated to be in good condition. Since water was flowing through the principal spillway, the intake riser could not be inspected, nor could the 36-inch pipe beneath the embankment be inspected. Park personnel report that the

Soil Conservation Service representatives inspect these systems when reservoir water levels permit. The impact basin was inspected and no signs of concrete deterioration, spalling, cracking or other signs of structural movement were observed. It was assessed that this structure is in good condition, as is the riprap-lined channel below the impact basin.

The emergency spillway is also judged to be in good condition. There are no signs of channel slope instability, channel bottom instability, erosion, or other features that would adversely affect the performance of the spillway.

b. Design and Construction Data. Available design documentation included preliminary design reports, design reports, soil testing results, foundation investigations, and a geologic profile through the dam site. The Department of Environmental Resources (DER) files contained a complete set of design drawings, which were compared with the as-built drawings located at the Park Office. There were no significant differences between these drawings. Slope stability and hydrologic/hydraulic calculations were reviewed for completeness and validity of the assumptions. The scope of the calculations were found to be adequate and are assumed to be correct.

The design documentation was, for the most part, complete. It is judged that construction documentation, including DER photographs, inspection memorandums, and Soil Conservation Service (SCS) progress reports were sufficient to conclude that the embankment was constructed in accordance with the design requirements. Records in the DER files indicate that the embankment materials were to be constructed to a density of at least 95 percent of the maximum density as defined by ASTM D-698, Method "A". It is also understood and documented in the as-built plans that the required placement water content tolerance was from -1 percent to +2 percent of the optimum moisture content. Evaluation of these requirements indicated that the placement criteria for the types of material described on the drawings is appropriate. The limited records in the design files indicate that all density test results were at least 97 percent of the specification requirements, and within the moisture content requirements.

A review of the stability analysis indicates that the minimum factor of safety on the upstream slope is 1.66 for rapid draw down conditions. And for steady state conditions, the downstream slope has a minimum factor of safety of 1.71. The input parameters used for this stability analysis were reviewed and are assessed to be reasonable. The structural calculations were reviewed for completeness, found to be adequate and assumed to be correct.

c. Operating Records. There are no operating records maintained, such as high flows, high water levels, or other features associated with the discharge of water.

d. Post-Construction Changes. There are no reports nor is there any evidence that modifications were made to the dam or appurtenant facilities.

e. Seismic Stability. This dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake conditions. Since the static stability analysis indicates that the dam is stable under static loading conditions, by definition of the Corps of Engineers criteria, the seismic stability of the dam is also adequate.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Evaluation. The visual inspection and review of design and as-built documentation indicate that the dam, foundation, and appurtenant structures of Mauch Chunk Creek Dam are in good condition. The hydrologic and hydraulic computations presented in the design documents and summarized herein in Appendix C indicate that the dam was designed to pass the probable maximum flood (PMF). Therefore, the discharge systems of the structure are considered to be "Adequate". It is noted that although the structure has been designed to pass the PMF, significant property damage is likely to occur due to high flows in Mauch Chunk Creek through the town of Jim Thorpe, Pennsylvania. The work plan prepared by the Soil Conservation Service (SCS) for the Mauch Chunk Creek Watershed indicates that when discharges from the dam exceed 207 cfs, significant property damage is likely to occur. Since the probable maximum flood will have a flow on the order of 10,000 cfs, extreme property damage is inevitable and loss of life in Jim Thorpe is possible.

b. Adequacy of Information. The design information available for this inspection was adequate and comprehensive. It is noted that construction data included photographs, Department of Environmental Resources (DER) inspection memoranda and several SCS progress reports, together with inspection reports performed by SCS representatives. Summaries of construction test results were noted in SCS progress reports. These reports indicate that sufficient testing was performed by SCS representatives to insure that the dam was built in accordance with the specification criteria.

c. Urgency. It is concluded that the recommendations presented in Section 7.2 be implemented as soon as practical.

7.2 Remedial Measures.

a. Facilities. It is recommended that the marshy areas located to the west of the principal spillway discharge channel be graded and drained. This drainage should be periodically collected and checked for changes in flow rates or changes in turbidity.

Similarly, the marshy area designated by the dead trees downstream of the emergency spillway should be monitored periodically. Although it is impractical to monitor flows in this area, it is recommended that the area be regraded and drained so the overall condition of the area can be periodically monitored for any gross changes in flow rates or turbidity. The area should be checked for concentrated flows which may lead to piping.

Periodic checks of the emergency spillway system should be made, and the woody vegetation removed before it affects the discharge capacity of the spillway. The riprapped channel immediately below the principal spillway impact basin should be monitored after any significant discharge passes through the channel. As necessary, the principal spillway channel should be rehabilitated to insure that it operates properly in time of need.

b. Warning and Inspection Procedures. Because of the location of the dam upstream of a highly populated area, Jim Thorpe, Pennsylvania, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. This procedure should include a method of warning downstream residents that high flows are to be expected along the creek. If abnormally high flows are expected, procedures for evacuating persons within Jim Thorpe should be implemented.

The Owner should develop an inspection checklist as an ammendment to the maintenance procedure to insure that all critical items are inspected and maintained on a regular and periodic basis.

APPENDIX

A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM *Mauch Chunk Dam*

ID # *PA 00605*

ITEM	REMARKS
AS-BUILT DRAWINGS	*None available in DER files. DER files contain construction drawings labeled "For Review Only"*
REGIONAL VICINITY MAP	*Dam located on USGS Quadrangle entitled "Nesquehoning, Pennsylvania". See Appendix E, Plate 1.*
CONSTRUCTION HISTORY	*SCS weekly summaries of construction and DER inspection reports summarized the construction history of this project.*
TYPICAL SECTIONS OF DAM	*Yes. Data obtained from SCS. See Plate 3, Appendix E.*
OUTLETS - PLAN	*Data obtained from SCS. See Plates 5 through 7 of Appendix E.*
DETAILS	
CONSTRAINTS	
DISCHARGE RATINGS	*None available.*
RAINFALL/RESERVOIR RECORDS	*None.*

c. Validity. There is no reason to question the validity of the data.

ITEM	REMARKS
DESIGN REPORTS	*Yes. The report was prepared by SCS (Site PA-462) contained a summary of the hydrologic, hydraulic, structural and soils data. The report also contains a geologic investigation and specifications for construction. A summary of the slope stability analyses is also contained in the report.*
GEOLOGY REPORTS	*Yes. Geology report is contained in the "Design Report", also refer to Appendix F.*
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	*Yes. A summary of all these analyses is presented in the "Design Report" prepared by SCS.*
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	*Yes.. The drawings contain logs of test borings, compaction data and other basic soils tests. There were also four drawings in DER files which contained geologic sections through the dam facilities. The "Design Report" contains summaries of soils tests and calcualtions.*
POST-CONSTRUCTION SURVEYS OF DAM	*None performed.*
BORROW SOURCES	*These sources are designated on the drawings.*

ITEM	REMARKS
MONITORING SYSTEMS	*None*
MODIFICATIONS	*Yes. Stilling basin was repaired after Tropical Storm Agnes, July, 1972.*
HIGH POOL RECORDS	*None*
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	*None*
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	*None*
MAINTENANCE OPERATION RECORDS	*Yes*

ITEM	REMARKS	
SPILLWAY PLAN	*Yes. See Plate 9, Appendix E.*	*All drawings prepared by SCS.*
SECTIONS	*No*	
DETAILS	*Yes. See Plate 9, Appendix E.*	
OPERATING EQUIPMENT PLANS & DETAILS	*Yes. See Appendix E. for drawings.*	

MISCELLANEOUS

1. *"Watershed Work Plan", Mauch Chunk Creek Watershed prepared by SCS, April 1965.*
2. *Construction drawings labeled "For Review Only", prepared by SCS, Site PA-462, Spring 1967, 25 sheets out of 27 sheets enclosed.*
3. *"Permit" to construct was issued 28 February 1968 by the State.*
4. *"Application" to construct a dam by Carbon County Commissioners, 26 February 1968.*
5. *Consulting Engineer, A.L. Wiesenberger Associates, Inc., Allentown, Pennsylvania.*
6. *"Report Upon the Application" dated 2 May 1968, by J.J. Ellam, Hydraulic Engineer.*
7. *SCS Inspection Reports and "Drawdown Applications".*
8. *Grouting performed by Layne of New York.*
9. *General Contractor was Feeser Construction Company, Schuylkill Haven, Pennsylvania.*

APPENDIX

B

CHECK LIST
VISUAL INSPECTION
PHASE I

Name Dam *Mauch Chunk Dam* County *Carbon* State *Pennsylvania* National ID # *PA 00605*

Type of Dam *Rolled Earth* Hazard Category *I (High)*

Date(s) Inspection *17 Aug. 78* Weather *Partly Cloudy* Temperature *90's*

Pool Elevation at Time of Inspection *1010.0* M.S.L. Tailwater at Time of Inspection *967.5* M.S.L.

Inspection Personnel:

Mary Beck (Hydrologist) *John Boschuk, Jr. (Geotechnical/Civil)*

Vince McKeever (Hydrologist)

John Boschuk, Jr. Recorder

Remarks:

Mr. Dennis DeMaro-Park Superintendent

Lou Ginder | *Members of the Board*

Theodore Hinger

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	*N/A*	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	*N/A*	
DRAINS	*N/A*	
WATER PASSAGES	*N/A*	
FOUNDATION	*N/A*	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	*N/A*	
STRUCTURAL CRACKING	*N/A*	
VERTICAL AND HORIZONTAL ALIGNMENT	*N/A*	
MONOLITH JOINTS	*N/A*	
CONSTRUCTION JOINTS	*N/A*	

"High" hazard classification is justified.

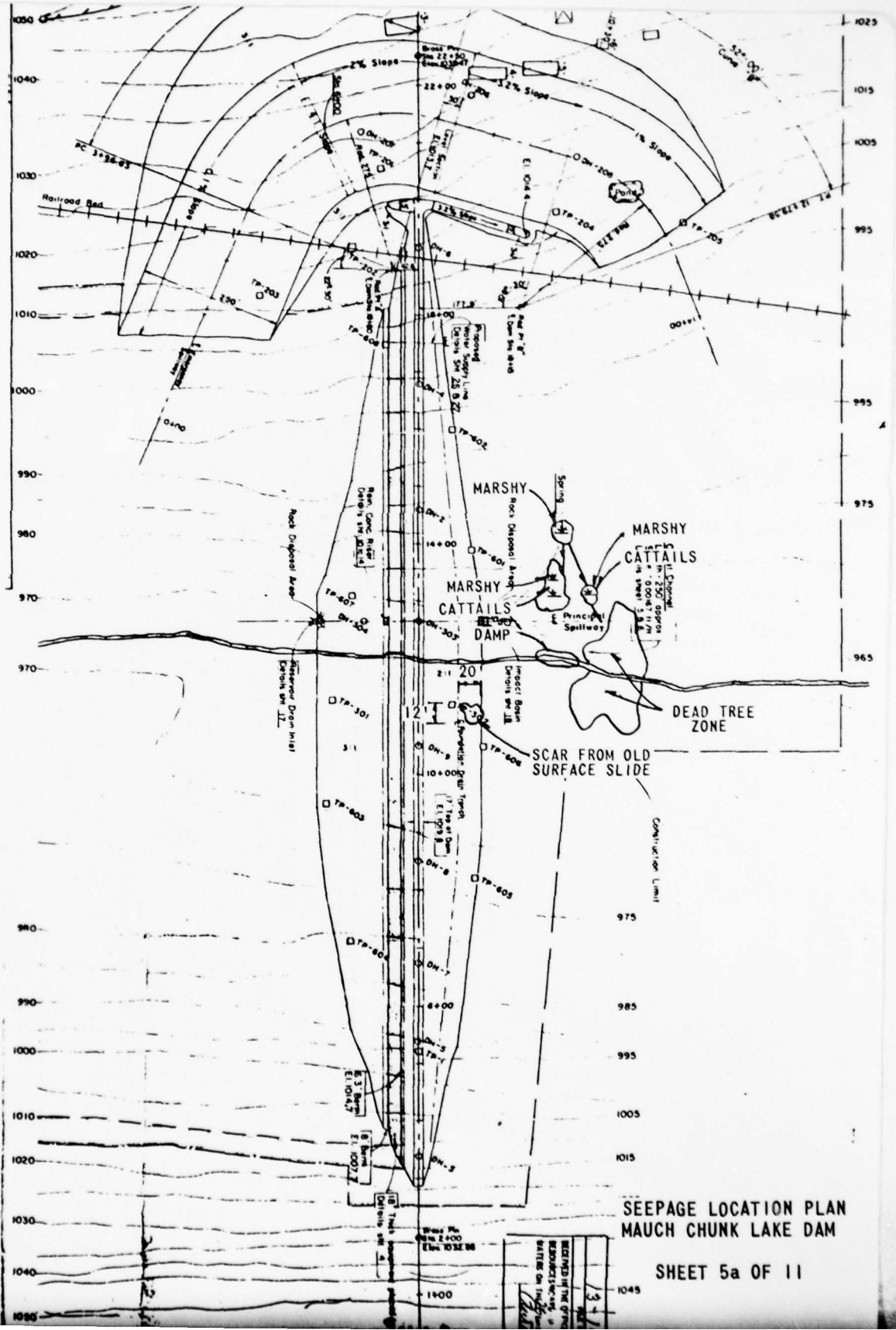
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	*None observed.*	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	*None observed.*	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	*None observed and downstream slope is covered with Crownvetch. Some minor erosion gallies less than 12 inches deep were uncovered below the vegetation but they do not present a current hazard to the dam.*	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	*No unusual movements in vertical or horizontal alignment were observed.*	
RIPRAP FAILURES	*None observed.*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	*There were no unusual movements, distortions or nonconformities observed.*	
ANY NOTICEABLE SEEPAGE	*See Sheet 5a. Wet zones were noted mostly on the left side of the discharge channel. Discussions with the Owners representative indicated that these seeps were there before construction and springs were in the foundation during grouting. Cattails and other vegetation changes denote the seepage areas. This seepage should be monitored for changes in rate.*	
STAFF GAGE AND RECORDER	*None*	
DRAINS	*Embankment drainage is conveyed via 12 inch pipes to the impact basin wing walls. Seepage discharge was equal in both pipes and clear.*	

indicate that all density test results were at least 97 percent of the specification requirements, and within the moisture content requirements.


MARSHY
MARSHY
CATTAILS
MARSHY
CATTAILS
DAMP
DEAD TREE
ZONE
SCAR FROM OLD
SURFACE SLIDE
Railroad Bed
Rock Disposal Area
Principal Spillway
Construction Limit
SEEPAGE LOCATION PLAN
MAUCH CHUNK LAKE DAM
SHEET 5a OF 11

OUTLET WORKS
(PRINCIPAL SPILLWAY)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	*None observed of any significant nature.*	
INTAKE STRUCTURE	*Good condition; no signs of spalling or deterioration.*	
OUTLET STRUCTURE	*The impact basin was observed to be in good condition with no significant spalling or deterioration.*	
OUTLET CHANNEL	*This channel was reconstructed after Tropical Storm Agnes, June 1972, and some deterioration would be expected if a similar storm occurred in the area. For normal conditions the pool is assessed to be stable.*	
EMERGENCY GATE (POND DRAIN)	*The gate was exercised and operated properly. The city water supply gate was not exercised. The pipes embedded in the embankment and drop inlet could not be inspected.*	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	*N/A. Natural channel cut into rock. The control section was measured to be 246 feet which is four feet narrower than the designed section.*	
APPROACH CHANNEL	*Good condition and well vegetated. Side slopes are stable.*	
DISCHARGE CHANNEL	*Good condition and well vegetated. Side slopes are stable.*	
BRIDGE AND PIERS	*None.*	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	*N/A*	
APPROACH CHANNEL	*N/A*	
DISCHARGE CHANNEL	*N/A*	
BRIDGE AND PIERS	*N/A*	
GATES AND OPERATION EQUIPMENT	*N/A*	

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	*None*	
OBSERVATION WELLS	*None*	
WEIRS	*None*	
PIEZOMETERS	*None*	
OTHER	*None*	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	*Reservoir side slopes are flat to moderate, stable, well vegetated, generally with trees.*	
SEDIMENTATION	*Very little sedimentation, no significant effect on flood water storage.*	

DOWNSTREAM CHANHEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	*Flood plain immediately below the dam is swampy with many uprooted trees, both in the flood plain and in the channel. The flood plain is approximately 200 feet wide.*	
SLOPES	*Valley slope immediately below the dam is 0.5%. The channel banks are about two feet high with side slopes ranging vertical to 1:1.*	
APPROXIMATE NO. OF HOMES AND POPULATION	*The town of Jim Thorpe would be flooded in event of high flows or failure of the dam.*	

APPENDIX

C

MAUCH CHUNK DAM
CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: *About 75% wooded, little residential development.*

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): *1009.7 (4220 Acre-Feet).*

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): *1019.8 (8333 Acre-Feet).*

ELEVATION MAXIMUM DESIGN POOL: *1015.7*

ELEVATION TOP DAM: *1019.8*

EMERGENCY SPILLWAY

a. Elevation *1013.7*

b. Type *Trapezoidal channel.*

c. Width *250 foot design, 246 feet measured.*

d. Length *650 feet.*

e. Location Spillover *Right abutment.*

f. Number and Type of Gates *None.*

PRINCIPAL SPILLWAY

a. Type *Reinforced concrete riser, conduit and impact basin.*

b. Location *975 feet from right abutment.*

c. Entrance inverts *1009.7 (weir crest elevation).*

d. Exit inverts *967.0*

e. Emergency draindown facilities *24 inch pond drain.*

HYDROMETEOROLOGICAL GAGES:

a. Type *None.*

b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: *270 cfs, flows greater than this produce out of bank flows in downstream Jim Thorpe.*

DAM SAFETY ANALYSIS
HYDROLOGIC/HYDRAULIC DATA

Date: 8/31/78
By: MFB
Sheet: 2 of 13

DAM Mauch Chunk Nat. ID No. PA 00605 DER No. 13-106

	ITEM/UNITS	Permit/Design Files (A)	Calc. from Files/Other (B)	Calc. from Observations (C)
1.	Min. Crest Elev., ft.	1019.8		
2.	Freeboard, ft.	0 (PMF)		
3.	Spillway(1) Crest Elev, ft.	1009.7		
3a.	Secondary(2) Crest Elev, ft.	1013.7		
4.	Max. Pool Elev., ft.	1019.8 (PMF)		
5.	Max. Outflow(3), cfs	10,533		
6.	Drainage Area, mi^2	5.95		5.96
7.	Max. Inflow(4), cfs	21,733 (PMF)		
8.	Reservoir Surf. Area, Acre	333		362
9.	Flood Storage(5), Acre-Feet	4170		
10.	Inflow Volume, inches	21.94		

Reference all figures by number or calculation on attached sheets:

Example: 3A - Drawing No. xxx by J. Doe, Engr., in State File No. yyyy.

NOTES:

(1) Main emergency spillway.

(2) Secondary ungated spillway.

(3) At maximum pool, with freeboard, ungated spillways only.

(4) For columns B, C, use PMF.

(5) Between lowest ungated spillway and maximum pool.

Date: 8/31/78
By: MFB
Sheet: 3 of 13

HYDROLOGIC/HYDRAULIC CALCULATIONS (cont.)

Item (from Sheet 2)	Source
1A thru 10A	Design Report prepared by Soil Conservation Service
6C, 8C	USGS Maps Nesquehoning (1976) Tamaqua (1976)

BY MEB DATE 8/31/78 SUBJECT Mauch Chunk Hydrology/Hydraulics SHEET 4 OF 13

CHK'D. BY DATE JOB No.

Classification (Ref. - Recommended Guidelines for Safety Inspection of Dams)

1. The hazard potential is rated as "High" as there would be loss of life if the dam failed.

2. The size classification is "Intermediate" based on its 50 ft. height and 4220 Ac-Ft. normal storage.

3. The spillway design flood, based on size and hazard classification, is the probable maximum flood (PMF).

Hydrologic and Hydraulic Analysis

1. The design folder contained calculations for rating curves, elevation-storage curve, and calculations for freeboard (PMF) inflow hydrograph.

2. Flood routing thru the reservoir were obtained from the Soil Conservation Service State Office.

3. Evaluation of data

Emergency spillway discharge calculations.
The original calculations were based on a bottom width (b) of 250 ft. a z (side slope) of 2. The construction drawings indicated b = 250 ft and z = 3. Field check indicated b = 246 ± ft and z ~ 3. As shown on sheet 10, the difference in discharge is negligible.

PMF Peak Inflow.
Information from Corps of Engineers, Bath Dist. indicated comparing this watershed to Penn Forest, D.A = 16.1 mile^2, & PMF = 16,800 cfs

Mauch Chunk PMF inflow =

$$\left(\frac{5.95}{16.1}\right)^{0.8} 16{,}800 = 7{,}526 \text{ cfs} < 21{,}733 \text{ cfs}$$

used in design, see sheet 7

BY MFB DATE 8/31/78 SUBJECT Mauch Chunk SHEET 5 OF 13

CHKD. BY DATE Hydrology / Hydraulics JOB No.

Therefore the design PMF peak inflow is conservative.

Sheets 6 thru 10 and sheet 13 are from the design report prepared by SCS and on file in Dept of Environmental Resources Office and sheets 11 & 12 were supplied by SCS

The Spillway is Rated as "Adequate" as the dam passes the PMF storm without overtopping

Downstream Conditions

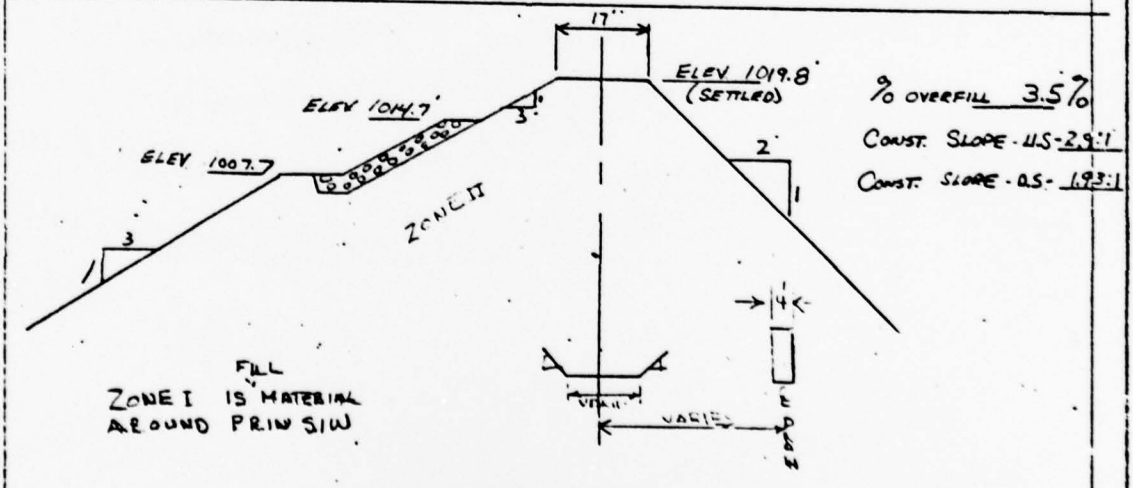
The maximum non damaging discharge has been determined by SCS to be ≥70 cfs (sheet 8). See Section 5 of the text for description of downstream conditions.

I-2 27

U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

DESIGN REPORT SUMMARY PA 462
MAUCH CHUNK

I.	Watershed data		
	A. Structure class	C	
	B. Drainage area	3808	Ac.
	C. Time of concentration - T_c	2.60	Hrs.
	D. Hydrologic curve number - C_n		
	1. Moisture condition II	77	
	2. Moisture condition III	92	
II.	Principal spillway		
	A. Conduit		
	1. Size (I.D.)	36	In.
	2. Length	160	Ft.
	B. Riser		
	1. Size	3'x9'	Ft.
	2. Height	40	Ft.
	C. Weir length	16.33	Ft.
	D. Orifice size	—	In.
	E. Pond drain size	24	In.
	F. Type of energy dissipator	IMPACT BASIN - 225 CFS	
III.	Emergency spillway		
	A. Width	250	Ft.
	B. Side slopes	3:1	
	C. Length of level section	30	Ft.
	D. Exit slope	32	Ft/Ft.
	E. Maximum velocity at control section (D.H.W.)	5.8	Ft/Sec.
	F. Duration of flow (D.H.W.) through emergency spillway	19.8	Hrs.
	G. Frequency of use	100 YR	
IV.	Earth fill		
	A. Height	50	Ft.
	B. Volume	220 000	C.Y.
	C. Compaction	ZONE I & II CLASS A	



Typical Cross Section - Not To Scale

ENGINEERING & WATERSHED PLANNING UNIT, UPPER DARBY, PA.

HYDROLOGIC & HYDRAULIC SUMMARY — PA 462

ELEMENT OF STRUCTURE	DETERMINING FACTOR	ELEV.	SURFACE AREA, Ac.	STORAGE ACRE-FEET	STORAGE INCHES*	INFLOW VOLUME, IN.*	INFLOW RATE, CFS	PEAK OUTFLOW CFS
CREST OF RISER	100-YR SEDIMENT ACCUMULATIONS + 4169 Ac-FT BENEFICIAL STOR	1009.7	333	4220 [1]	13.3	—	—	—
CREST OF EMI. S/W	100 YEAR FREQUENCY STORM	1013.7	392	5724 [2] 4/20/67 SMS	18.4	—	—	222.4
DESIGN HIGH WATER	1.00X VALUE FROM ES-1020 SHEET 4 OF 5 MULT COND II	1015.7	421	6690	21.05	7.13	7340	1759 [3] ~~1644~~
TOP OF DAM	1.0 X VALUE FROM ES-1020 SH. 5 OF 5 MULT COND II	1019.8	480	8390	26.4	21.94	21,733	10,533 [3]

* VOLUME EXPRESSED IN INCHES OF RUNOFF FROM CONTROLLED WATERSHED AREA OF 3808 ACRES.

1] DOES NOT INCLUDE 9.5 Ac-ft. SEDIMENT STORAGE ALLOCATED TO FLOOD POOL

2] 61 Ac-ft SEDIMENT + 3794 RECREATIONAL DEVELOPMENT + 375 Ac-ft WATER SUPPLY + ~~1594~~ 1594 Ac-ft FLOOD STORAGE 4/20/67 SMS

3] TOTAL — INCLUDES PIPE FLOW

PA DGS 2/10/67 A. SNYDER MANUAL CHANGE PA 462
HYDROLOGIC & HYDRAULIC Summary
I-3

AD-311 (7-61) U.S. DEPARTMENT OF AGRICULTURE

SPEED-MEMO

DATE: December 28, 1965

1

TO: ewis Wall, Civil Engineer

Howard W. Miller, Hydraulic Engineer

SUBJECT: WATERSHEDS (P. L. 566) - Mauch Chunk

MESSAGE *(Write concise message. Sign and forward parts 1 and 2 to addressee. Retain part 3)*

The principal outlet release rate on structure PA-462 should not exceed 270 c.f.s. in order to contain the 100-year frequency flood at Jim Thorpe within bank.

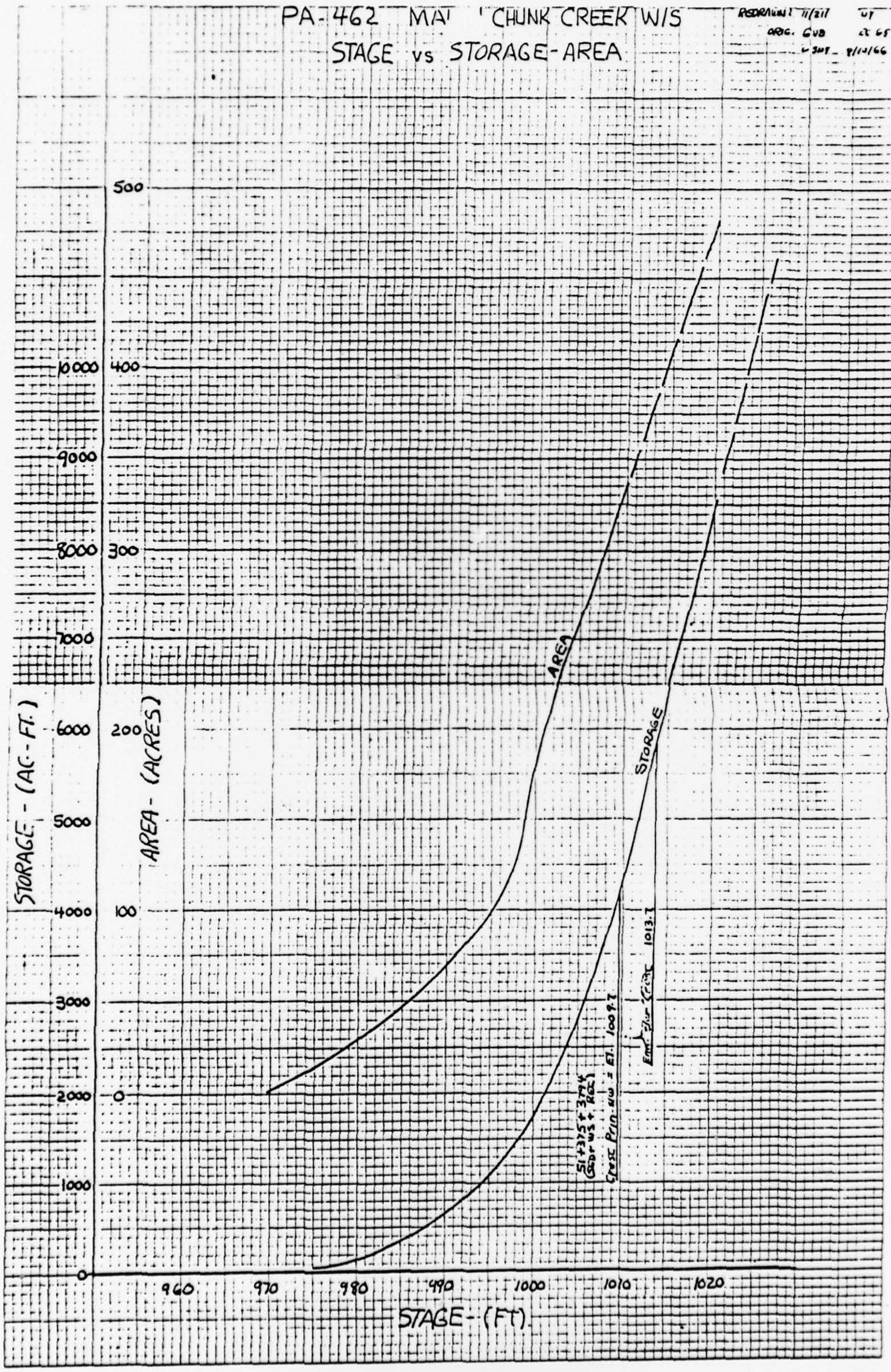
SIGNATURE Howard W. Miller

REPLY *(Use this space for reply. Sign and date. Return part 2 to sender. Retain part 1)*

for

JRE DATE

AD-311 (7-61)



PA-462 MAUCH CHUNK CREEK W/S
STAGE vs STORAGE-AREA
STORAGE - (AC-FT.)
AREA - (ACRES)
STAGE - (FT)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
0
100
200
300
400
500
960
970
980
990
1000
1010
1020
AREA
STORAGE
Crest Prin. Sw = El. 1009.2
1013.2

SCS-344a 5-57
Tabular Computations

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

[illegible] 1/30/67

DAS
1/27/67

STAGE VS DISCHARGE
COMPUTATIONS

PA 462 [illegible] [illegible]

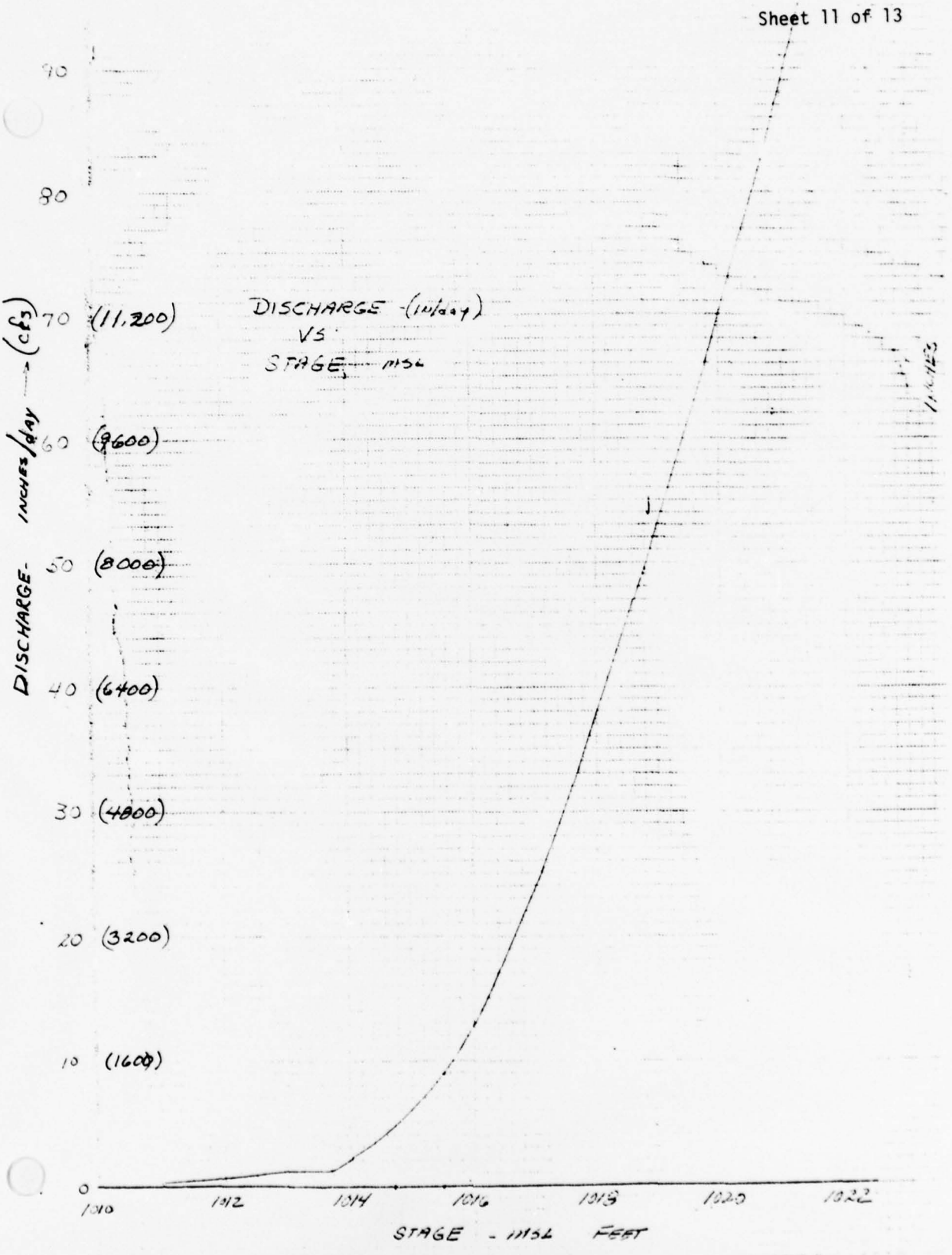
STAGE Feet [illegible]	EMERGENCY HP FEET	SPILLWAY L= 250', L=200' Q/b cfs/ft	TR-2 dc	DISCHARGE CASE ES-124 w= (250) 2dc (Z=2)	2.2% ENTRANCE chart 2of7 Qcm = w gc	Qcase = 59.5d / Qcm (cfs)	TOTAL Qout Pipe + E.Sw.	Q in/day
[illegible]				246			0	0
1010.5				3			0	0
1011.0							3	.02
1011.5							73	.46
1012.0							89	.55
1012.5							139	.87
1013.0						1.9% diff.	161	1.01
[illegible]	0	0	0	246 ~~230~~	0		162	1.02
1015.5	1.76	5	0.92	248.76 251.84	1243 1259	1183 1199	1410 1426	8.81 8.93
1016.4	2.65	10	1.46	250.38 252.92	2504 2529	2444 2469	2673 2698	16.71 17.00
1017.1	3.39	15	1.90	251.7 253.80	3776 3807	3716 3747	3947 3978	24.67 25.0[illegible]
1017.7	4.04	20	2.32	252.96 254.64	5059 5093	4999 5033	5231 5265	32.70 33.17
[illegible]	5.14	30	3.05	255.15 256.10	7655 7683	7595 7623	7829 7857	48.93 49.50
[illegible]	[illegible].14	40	3.70	257.1 257.40	10,284 10,296	10224 10 236	10 461 10,473	65.39 66.[illegible]
1020.7	7.00	50	4.30	258.9 259.60	12,945 12,980	12885 12,870	13 124 13,109	82.03 82.59
1021.5	7.80	60	4.85	259.70	15,582	15,522	15,763	99.30

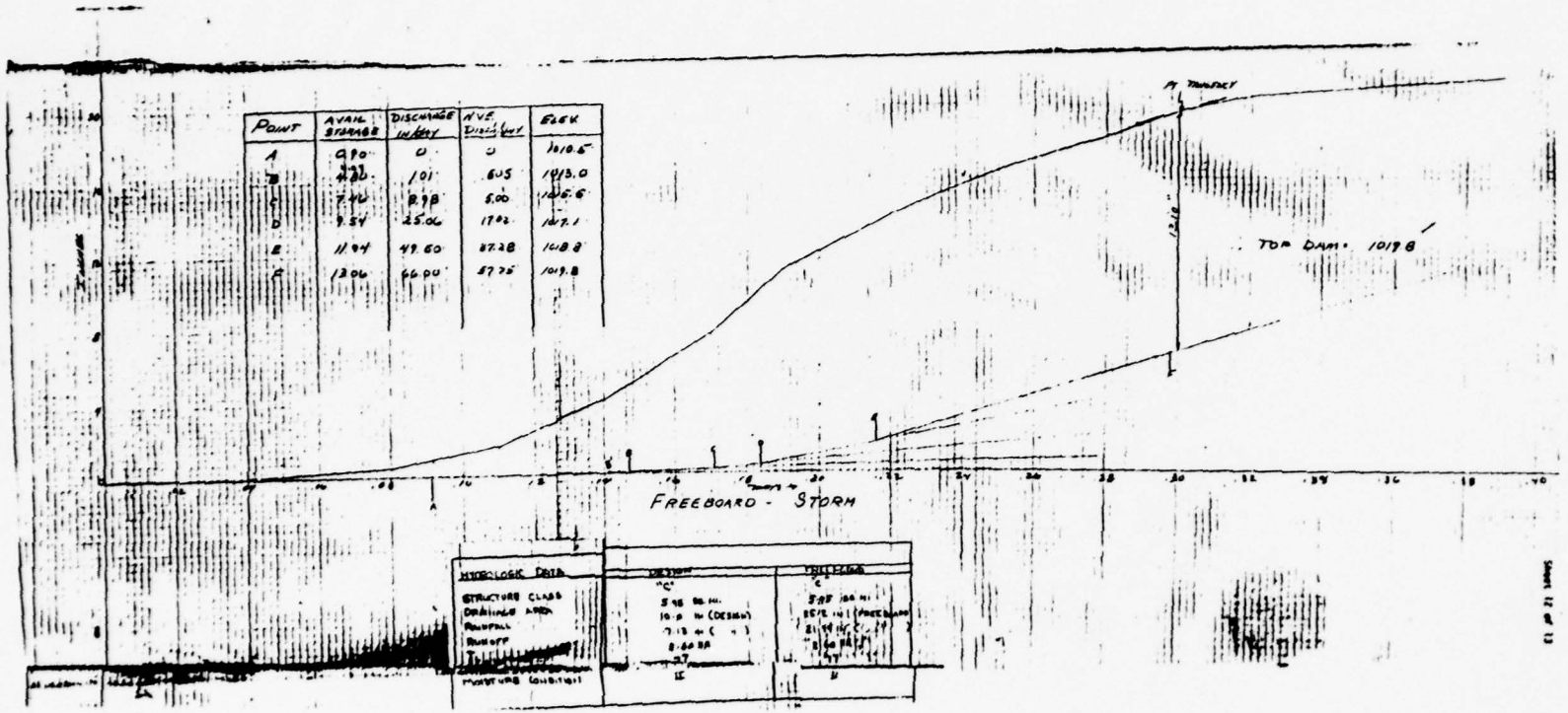
Note: bottom width 'b' field checked to be 246 ± feet. Z = 3 on construction plans and the spillway side slopes appear to be constructed 3H:1V

0.6% difference

Therefore, the difference in discharge is negligible

MFB 8/31/78


DISCHARGE (in/day)
VS
STAGE - MSL
DISCHARGE - INCHES/DAY → (CFS)
90
80
70 (11,200)
60 (9600)
50 (8000)
40 (6400)
30 (4800)
20 (3200)
10 (1600)
0
1910
1912
1914
1916
1918
1920
1922
STAGE - MSL FEET
INCHES


POINT
AVAIL STORAGE
DISCHARGE INDEX
N.V.D. DISCHARGE
ELEV
A 990 0 0 1010.6
B 221 101 .605 1013.0
C 7.42 8.78 5.00 1015.6
D 9.54 25.06 17.02 1017.1
E 11.94 49.60 37.28 1018.8
F 13.06 66.00 57.25 1019.8
TOP DAM. 1019.8
FREEBOARD - STORM
HYDROLOGIC DATA
STRUCTURE CLASS
DRAINAGE AREA
RAINFALL
RUNOFF
MOISTURE CONDITION

PA. PA-462 MAUCH CHUNK W/S

A. SNYDER 1/31/67

DRAWDOWN COMPUTATIONS 12

TIME DAYS = (0.505)(AC. FT)/(CFS)

ELEV. FT	STORAGE AC-FT	EFF DISCHARGE CFS	STOR INCREMENT AC-FT.	AVE DISCHARGE CFS	TIME DAYS	ACCUM TIME
1013.7	1600	162				
			100	162	0.312	
1013.5	1500	162				0.312
			220	161	0.690	
1013.0	1280	161				1.002
			250	150	0.842	
1012.5	1030	139				1.844
			150	113	0.670	
1012.0	880	88				2.514
			250	65.3	1.933	
1011.5	630	42.6				4.447
			200	22.7	4.409	
1011.0	430	2.9				8.896
			10	1.5	3.37	
1010.9	420	0				12 DAYS.

10 DAY DRAWDOWN ELEV ≈ 1010.9'

EAGLE FLOW ELEV.

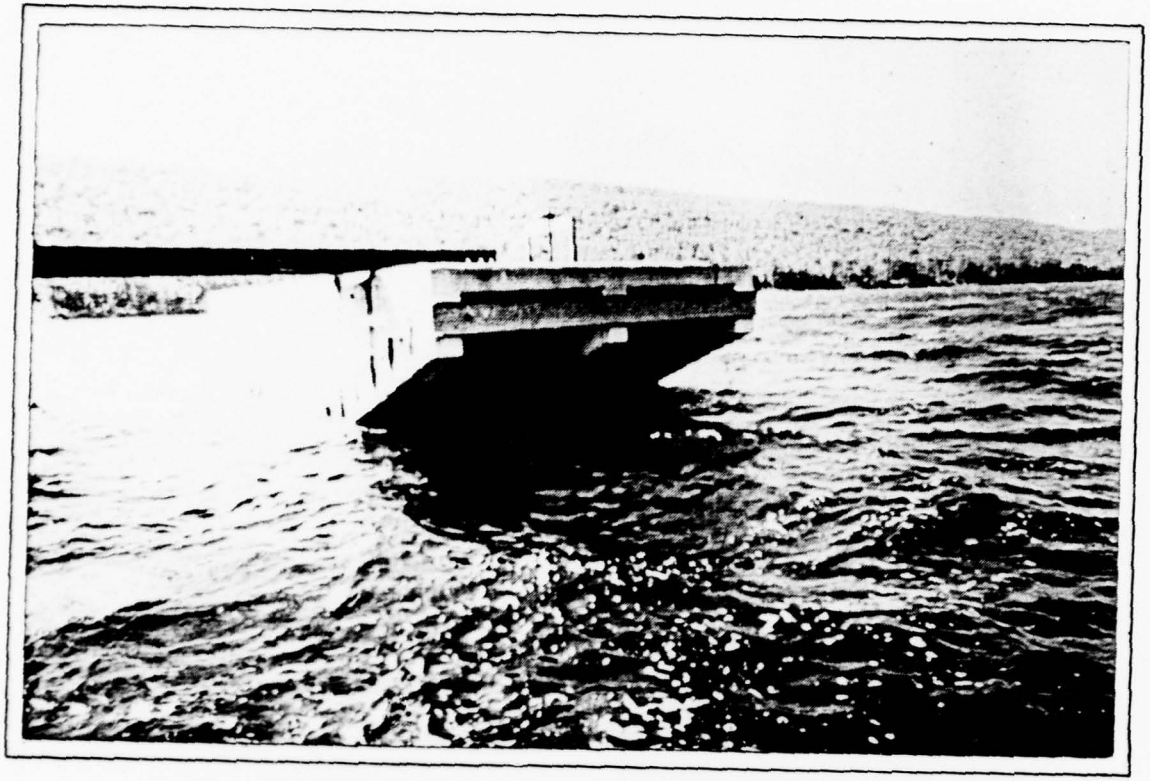
$Q_w = 59.5 = 42.5 H_w^{3/2}$

$H \approx 1.2$

EL = 1009.7 + 1.2 = 1010.9

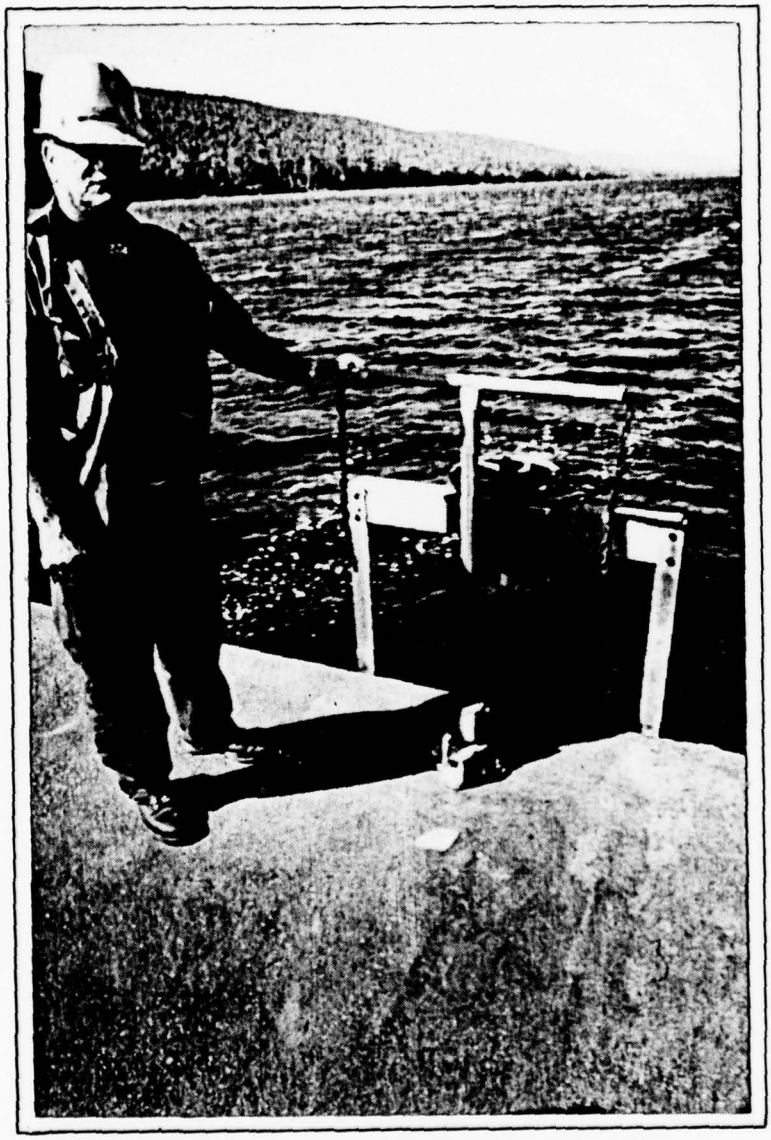
APPENDIX

D



PRINCIPAL SPILLWAY

PHOTOGRAPH NO. 1

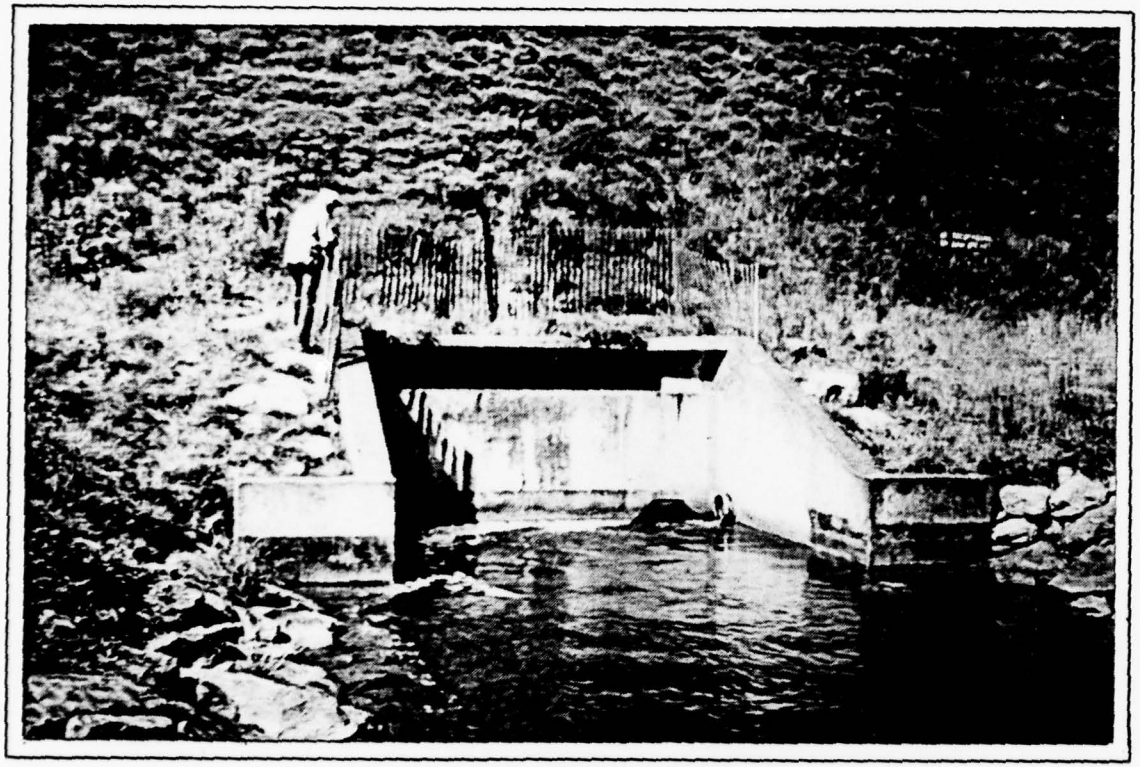


POND DRAIN VALVE LOCATED
ON TOP OF PRINCIPAL SPILL-
WAY RISER.

PHOTOGRAPH NO. 2

VIEW OF PRINCIPAL SPILLWAY DISCHARGE CHANNEL
FROM TOP OF DAM. NOTE PATCHES OF CATTAILS
TO THE LEFT OF THE CHANNEL.

PHOTOGRAPH NO. 3



PRINCIPAL SPILLWAY OUTLET STRUCTURE. NOTE SEEPAGE OUTLET PIPES FOR TOE DRAIN SYSTEM.

PHOTOGRAPH NO. 4

VIEW OF PRINCIPAL SPILLWAY DISCHARGE CHANNEL. NOTE CATTAILS TO THE LEFT OF THE DISCHARGE CHANNEL.

PHOTOGRAPH NO. 5

APPROACH CHANNEL TO EMERGENCY
SPILLWAY.

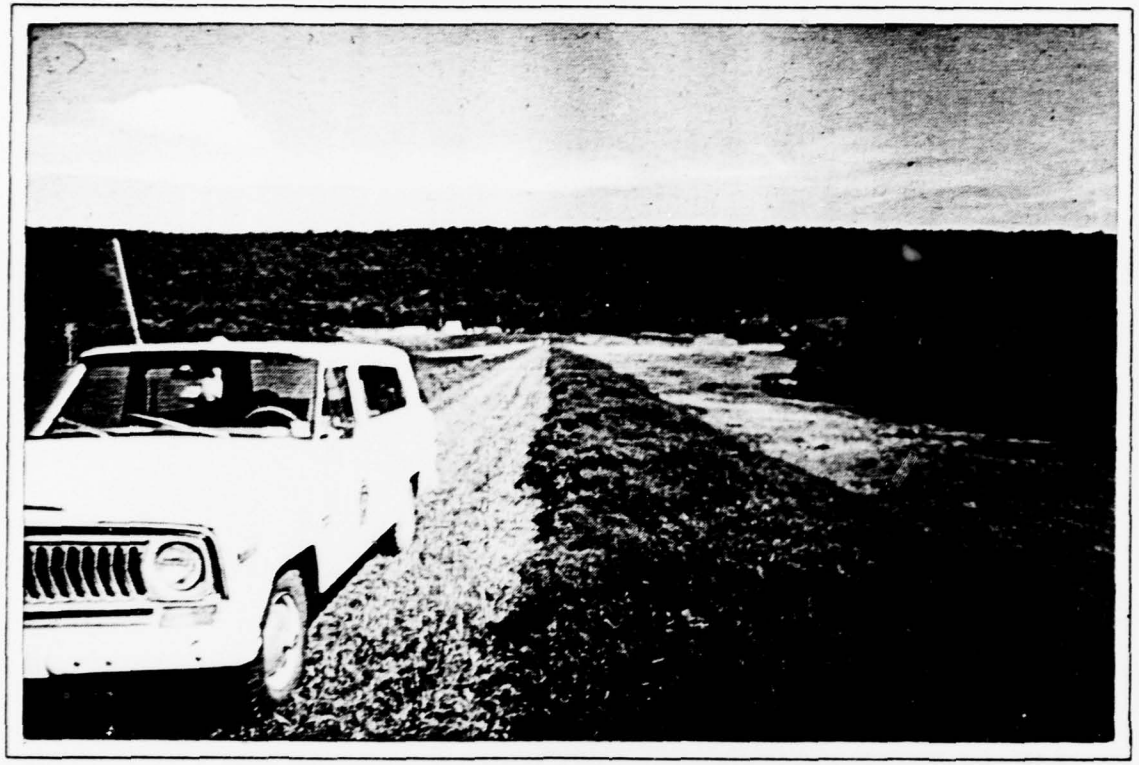
PHOTOGRAPH NO. 6

DOWNSTREAM VIEW OF EMERGENCY SPILLWAY.

PHOTOGRAPH NO. 7

VIEW OF UPSTREAM SLOPE LOOKING
TOWARDS RIGHT ABUTMENT.

PHOTOGRAPH NO. 8



VIEW OF DOWNSTREAM SLOPE. NOTE
DENSE COVER OF CROWNVETCH.

PHOTOGRAPH NO. 9

VIEW OF CATTAILS DENOTING SEEPAGE ZONES. SEE SHEET 5a, APPENDIX B FOR LOCATIONS.

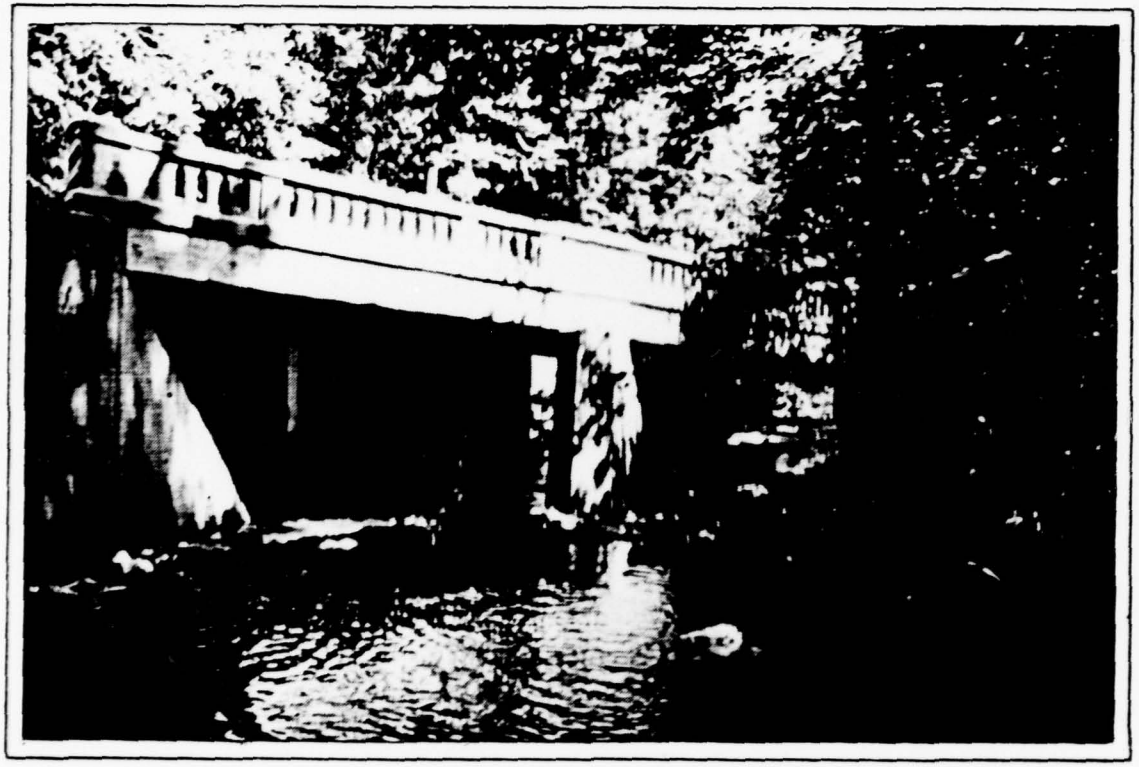
PHOTOGRAPH NO. 10

CLOSEUP OF SEEPAGE SOURCES WITHIN
MARSHY AREAS DOWNSTREAM OF DAM.
SEE SHEET 5a, APPENDIX B FOR
LOCATIONS.

PHOTOGRAPH NO. 11

VIEW OF STREAM DOWNSTREAM OF DAM
JUST ABOVE FIRST BRIDGE BELOW THE
DAM.

PHOTOGRAPH NO. 12



VIEW OF FIRST HIGHWAY BRIDGE
DOWNSTREAM OF DAM.

PHOTOGRAPH NO. 13

TYPICAL VIEW OF MAUCH CHUNK CREEK
AS IT PASSES THROUGH JIM THORPE,
PENNSYLVANIA.

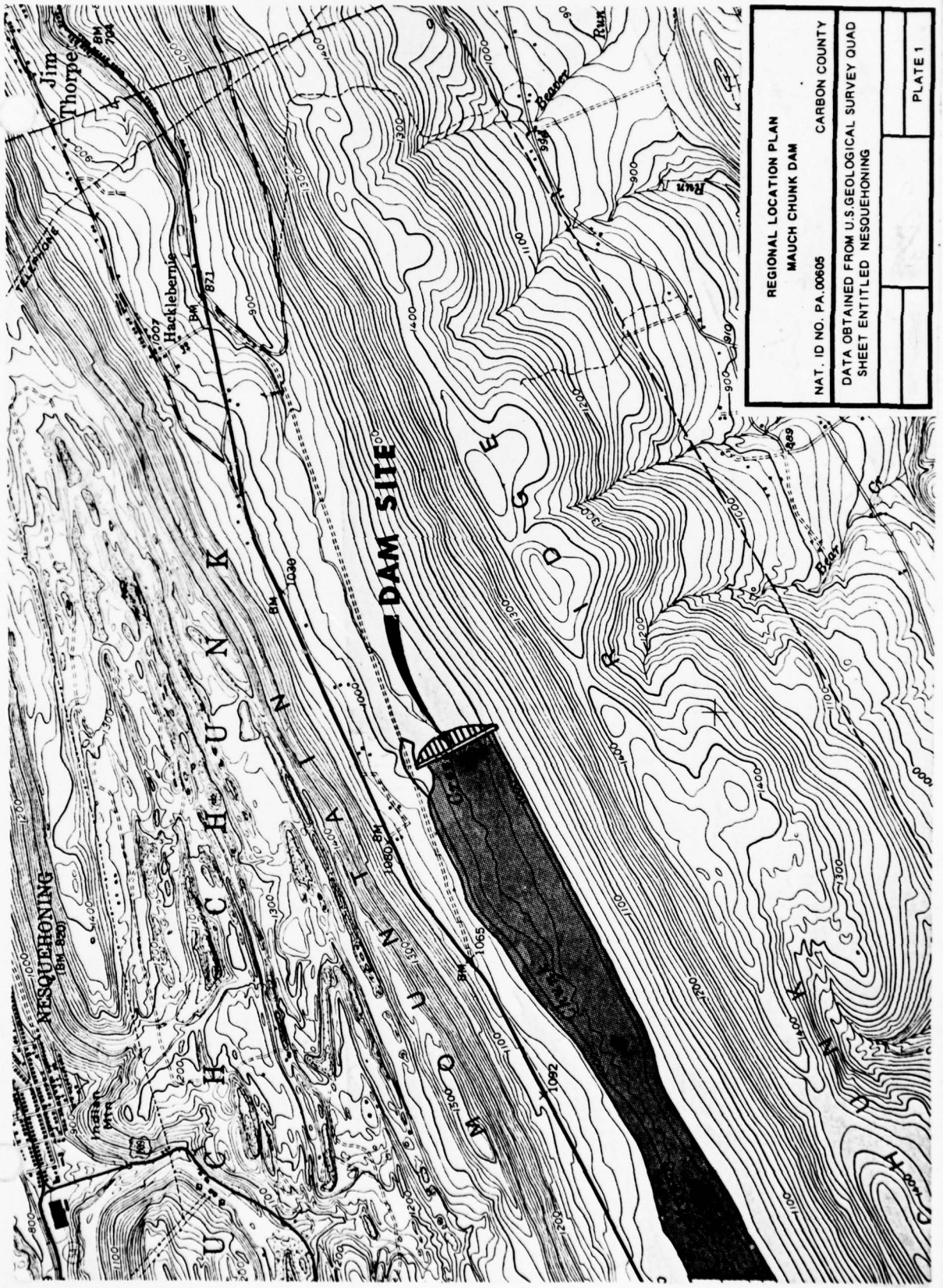
PHOTOGRAPH NO. 14

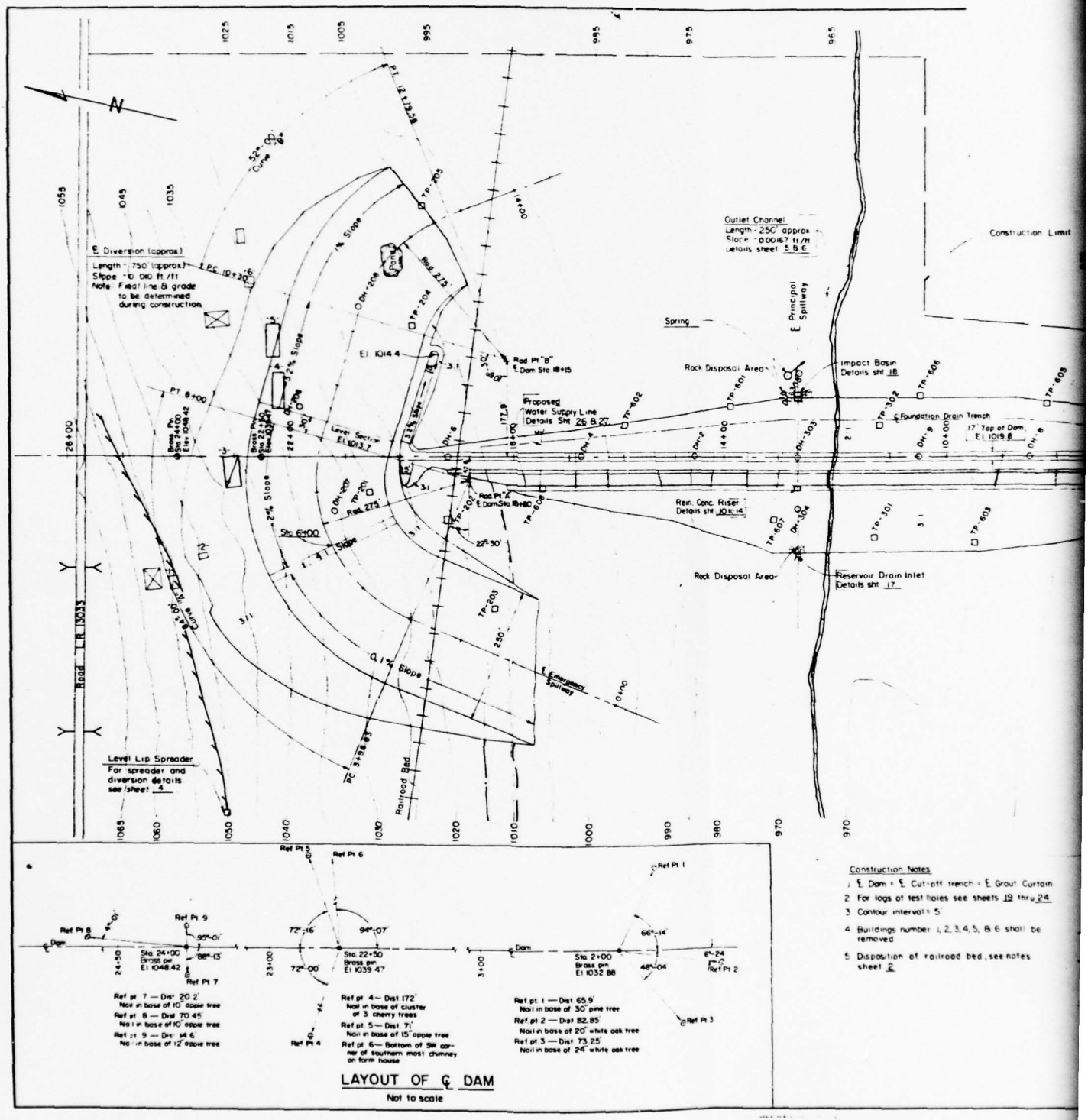
APPENDIX

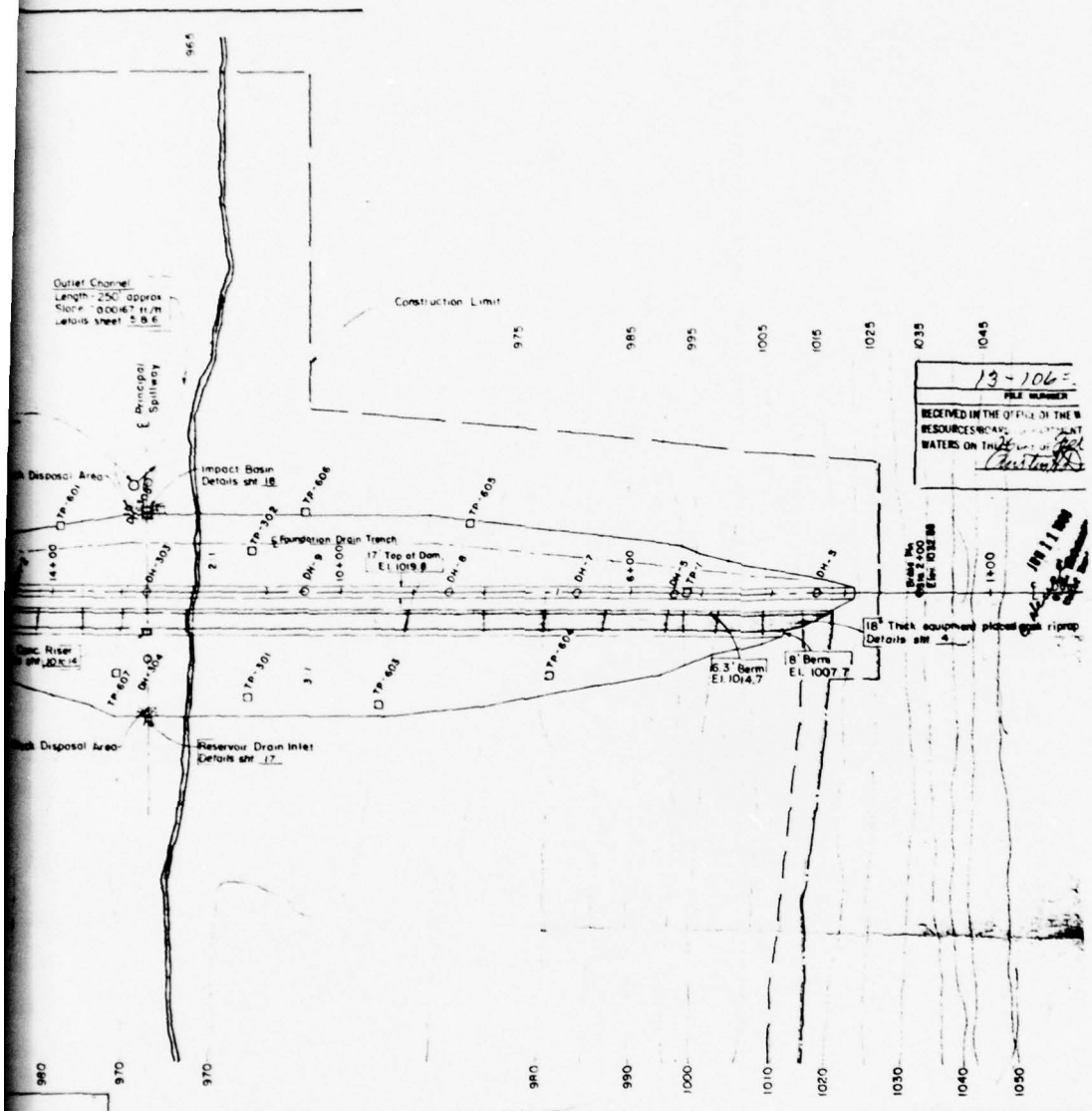
E

ON TOP OF PRINCIPAL SPILLWAY RISER.

PHOTOGRAPH NO. 2




Outlet Channel
Length - 250' approx
Slope - 0.0067 ft/ft
Details sheet 5 & 6
Construction Limit
℄ Diversion (approx.)
Length - 750' (approx.)
Slope - 10' 0.10 ft./ft.
Note: Final line & grade to be determined during construction.
Spring
℄ Principal Spillway
Rock Disposal Area
Impact Basin Details sht 18
Proposed Water Supply Line Details Sht 26 & 27
℄ Foundation Drain Trench
17' Top of Dam El. 1019.8
Reinf. Conc. Riser Details sht 10 & 14
Rock Disposal Area
Reservoir Drain Inlet Details sht 17
℄ Emergency Spillway
Level Lip Spreader
For spreader and diversion details see sheet 4
Road L.R. 13033
Railroad Bed
Ref Pt 1
Ref Pt 2
Ref Pt 3
Ref Pt 4
Ref Pt 5
Ref Pt 6
Ref Pt 7
Ref Pt 8
Ref Pt 9
Ref pt. 7 — Dist. 20.2' Nail in base of 10" apple tree
Ref pt. 8 — Dist. 70.45' Nail in base of 10" apple tree
Ref pt. 9 — Dist. 14.6' Nail in base of 12" apple tree
Ref pt. 4 — Dist 172' Nail in base of cluster of 3 cherry trees
Ref pt. 5 — Dist. 71' Nail in base of 15" apple tree
Ref pt. 6 — Bottom of SW corner of southern most chimney on farm house
Ref pt. 1 — Dist 65.9' Nail in base of 30" pine tree
Ref pt. 2 — Dist 82.85' Nail in base of 20" white oak tree
Ref pt 3 — Dist 73.25' Nail in base of 24" white oak tree
LAYOUT OF ℄ DAM
Not to scale
Construction Notes
1 ℄ Dam = ℄ Cut-off trench = ℄ Grout Curtain
2 For logs of test holes see sheets 19 thru 24
3 Contour interval = 5'
4 Buildings number 1, 2, 3, 4, 5, & 6 shall be removed
5 Disposition of railroad bed, see notes sheet 2



13-106

FILE NUMBER

RECEIVED IN THE OFFICE OF THE
RESOURCES
WATERS ON

Construction Notes

1. ℄ Dam = ℄ Cut-off trench = ℄ Grout Curtain
2. For logs of test holes see sheets 19 thru 24
3. Contour interval = 5'
4. Buildings number 1, 2, 3, 4, 5, & 6 shall be removed
5. Disposition of railroad bed, see notes sheet 2

LEGEND

- House
- Barn
- Other Buildings
- Design High W El. 1015.7
- Normal Pool El. 1009.7
- Test Holes
- Stream
- Culvert
- Diversion

FOR REVIEW ONLY

0 25 50 100 200
SCALE in FEET

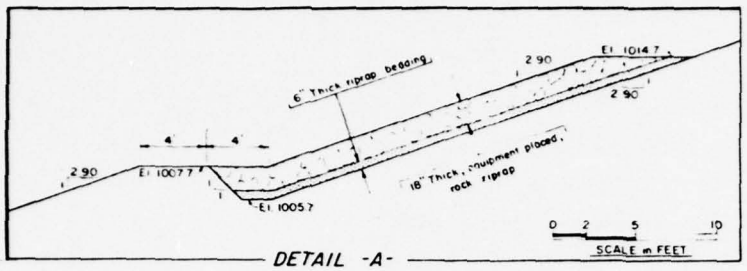
2

PLAN OF DAM & APPURTENANCES
MAUCH CHUNK LAKE DAM

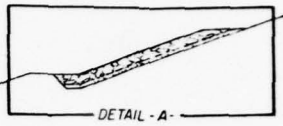
NAT. ID NO. PA.00605 CARBON COUNTY

DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO. 3 OF 27, DATED MARCH, 1967

PLATE 2



DETAIL -A-



DETAIL -A-

Construc

ZONE II

2.90

Approx. Stripping or Foundation Excavation Line

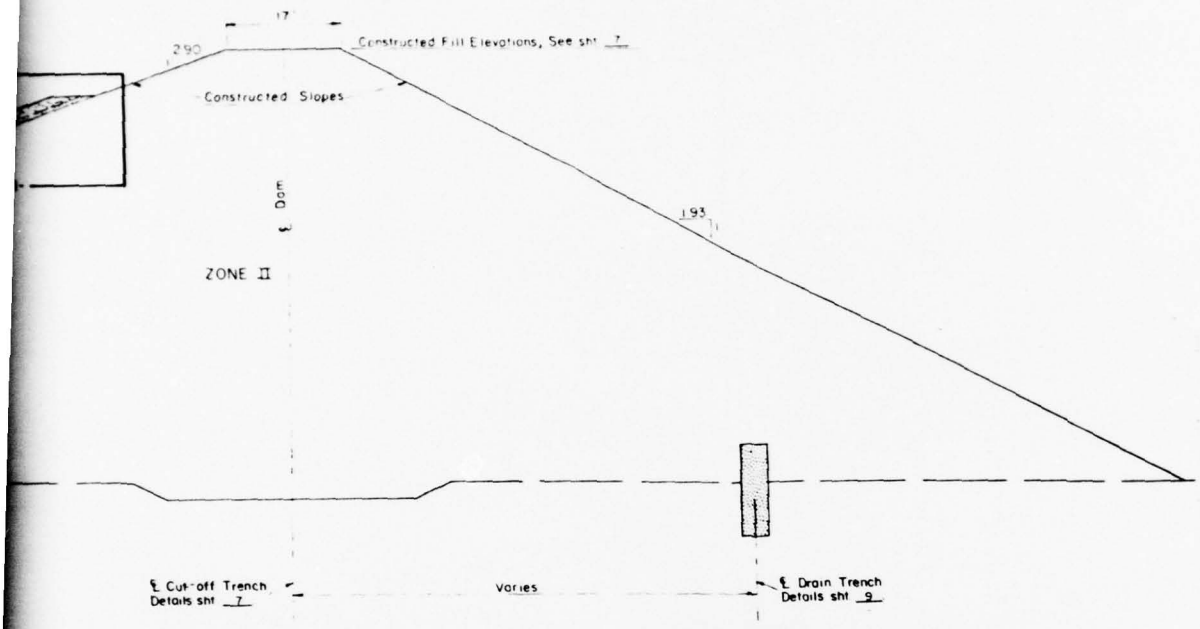
NOTE
Zone I (Not shown)
Details sht 6

℄ Cut-off Trench
Details sht 7

TYPICAL SECTION OF

0 2 6 12

SCALE in FE



TYPICAL SECTION OF EMBANKMENT

0 2 6 12 24

SCALE in FEET

CONSTRUCTION DETAILS

1 Zone II material shall be selectively placed so that the coarser material will be in the upstream & downstream portions of Zone II

2 Bedding for rock riprap as shown on this sheet and sheet 5 shall meet drain fill gradation limits, see sheet 9

Zone	MATERIAL	Max rock Size	Max [1] Lift	Readiness [2] Content	COMPACTION Class	COMPACTION Definition
I	Material as represented by TP 205, depth 1-2.5 classified as ML	6"	9"	Optimum ± 2.0%	A	100% Max. density by ASTM D-698 Method A
II	Material as represented by TP 205, depth 1-2.5, classifiedas ML Also material as represented by TP 127 depth 4-8.5 classified as SC-SM and material represented by TP 102, depth 2.5-6 classifed as SM or ML	6"	9"	Optimum ± 2.0%	A	95% Max density by ASTM D-698 Method A

1 Maximum permissible lift thickness before compaction
2 Water content of fill matrix at time of compaction

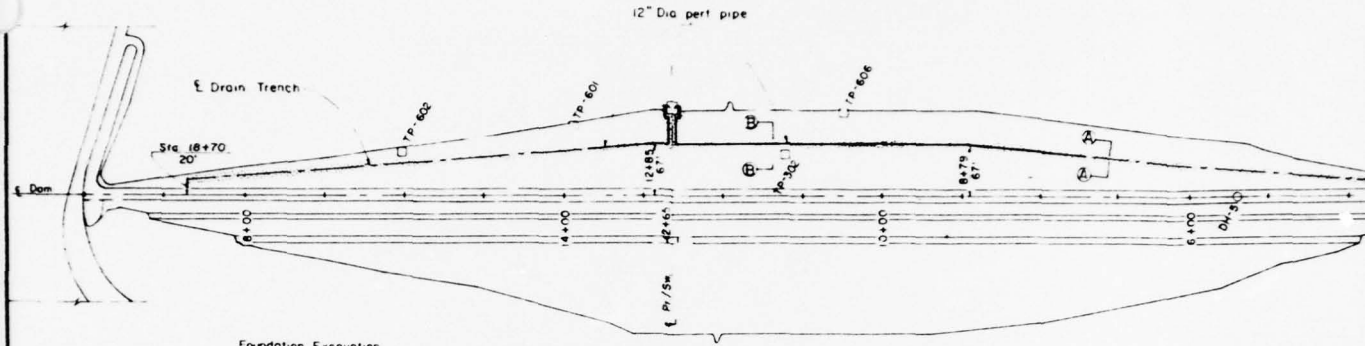
2

TYPICAL SECTION OF EMBANKMENT
MAUCH CHUNK LAKE DAM

NAT. ID NO. PA.00605 CARBON COUNTY

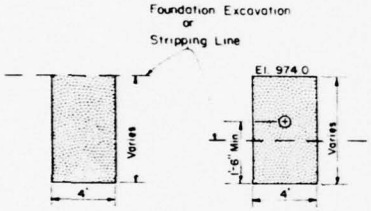
DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO. 4 OF 27, DATED MARCH, 1967

PLATE 3

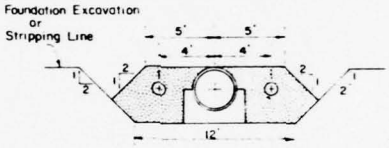


PLAN OF DRAINAGE SYSTEM

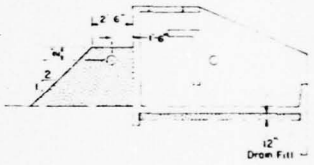
0 25 50 100 200
SCALE in FEET



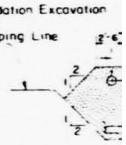
SECTION A-A
Typical between approx. Sta 3+55 to 7+30 and Sta. 13+75 to 18+70



SECTION B-B
Typical between approx. Sta 7+30 to 13+75

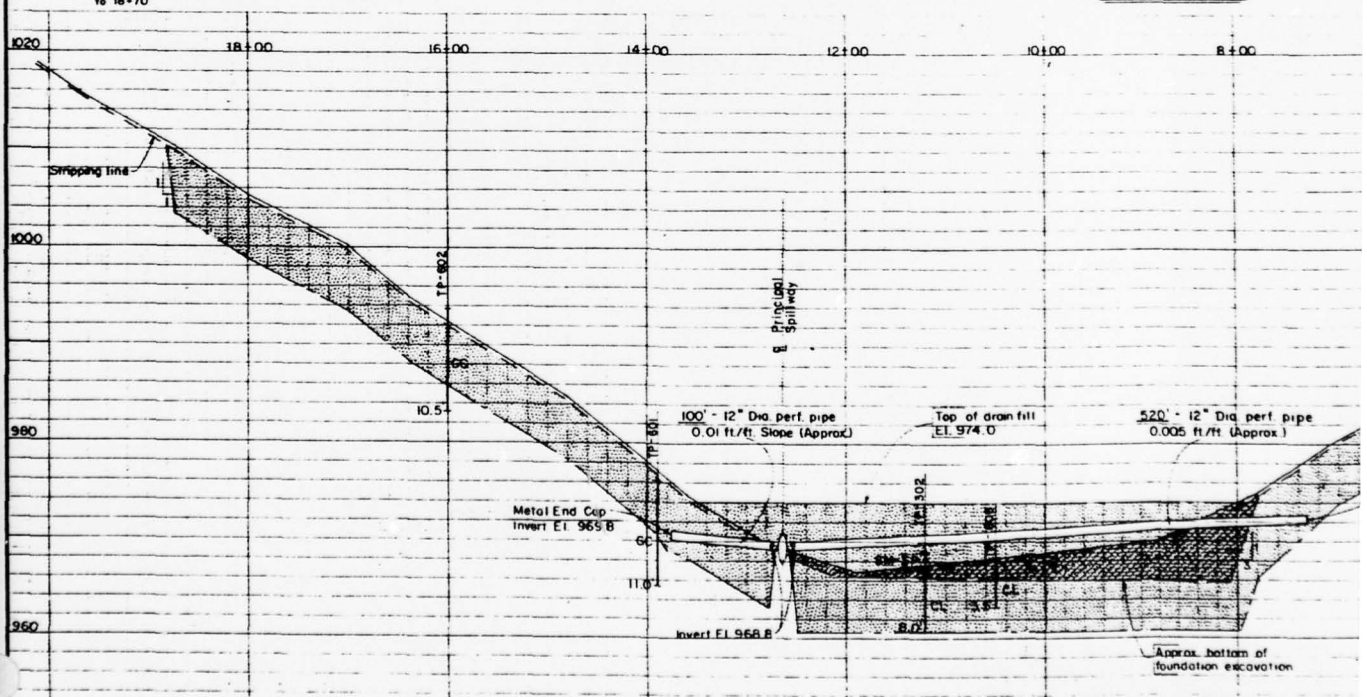


SECTION C-C

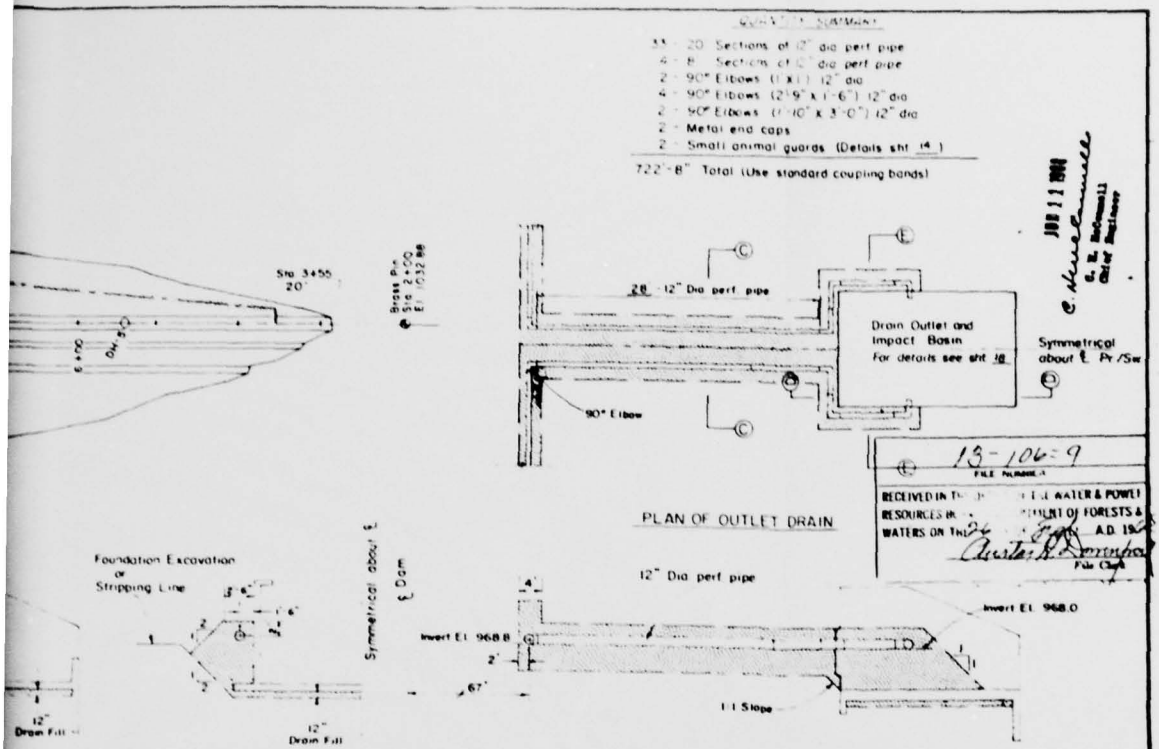


SECTION D-D

Sections not to scale



Profile Along ℄ of drain (Looking Downstream)



- 20 Sections of 12" dia perf pipe
- 8 Sections of 12" dia perf pipe
- 2 - 90° Elbows (1'-6" x 1'-6") 12" dia
- 4 - 90° Elbows (2'-9" x 1'-6") 12" dia
- 2 - 90° Elbows (1'-10" x 3'-0") 12" dia
- 2 - Metal end caps
- 2 - Small animal guards (Details sht 14)

722'-8" Total (Use standard coupling bands)

JUL 11 1968

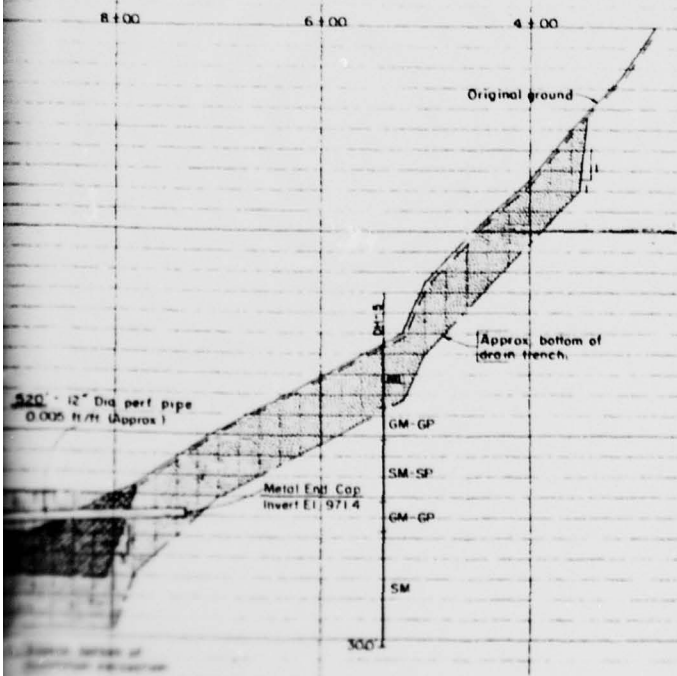
G. E. Rockwell
District Engineer

13-106-9
FILE NUMBER

RECEIVED IN THE OFFICE OF THE WATER & POWER RESOURCES BOARD ON THIS 24 DAY OF JUNE A.D. 19 68

Curtis R. Dornblaser
File Clerk

Sections not to scale



CONSTRUCTION NOTES

1. All drain pipe shall conform to material specification 310 and shall be 12" dia., 16 gage, shape I, class I, type D perforated pipe.
2. The profiles of the bottom of all excavations as shown are only approximate. The required finished grades will be established during construction.
3. For logs of test holes see sheets 12 thru
4. Riprap bedding shall meet drain fill gradation limits.

GRADATION LIMITS FOR DRAIN FILL AND RIPRAP BEDDING

Sieve No.	% Passing
3"	100
1-1/2"	92 - 100
1"	87 - 99
3/4"	83 - 91
3/8"	73 - 81
No. 4	60 - 70
No. 8	47 - 57
No. 16	33 - 45

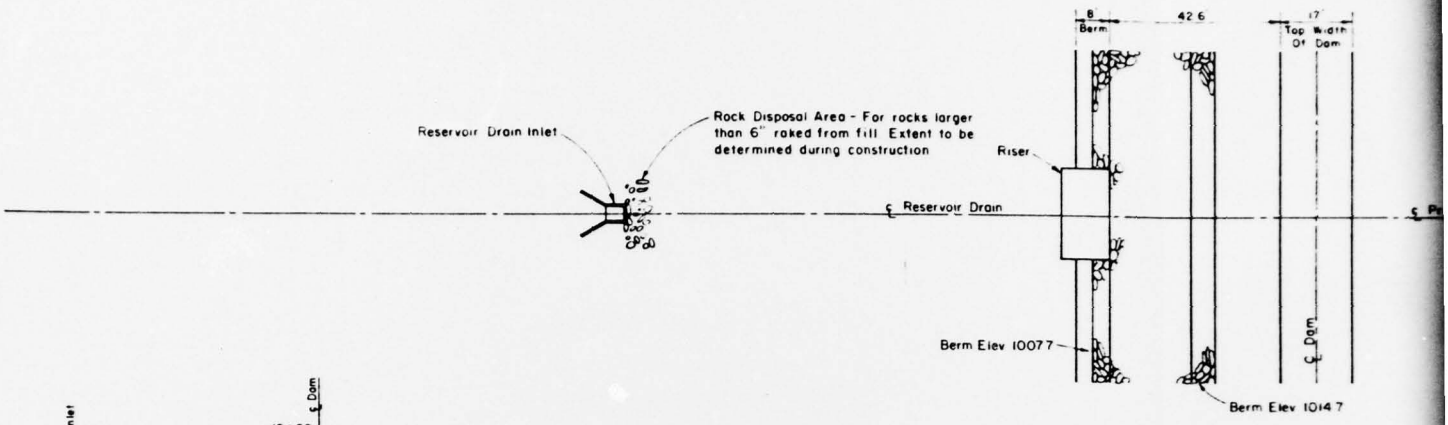
Note: Percentage based on dry weight

EMBANKMENT DRAINAGE DETAILS
MAUCH CHUNK LAKE DAM

NAT. ID NO. PA.00605 CARBON COUNTY

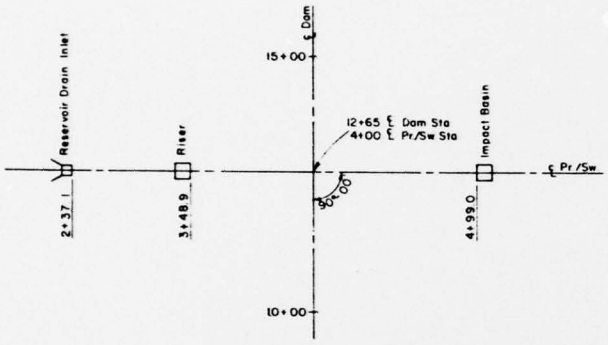
DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO. 9 OF 27, DATED MARCH, 1967

PLATE 4

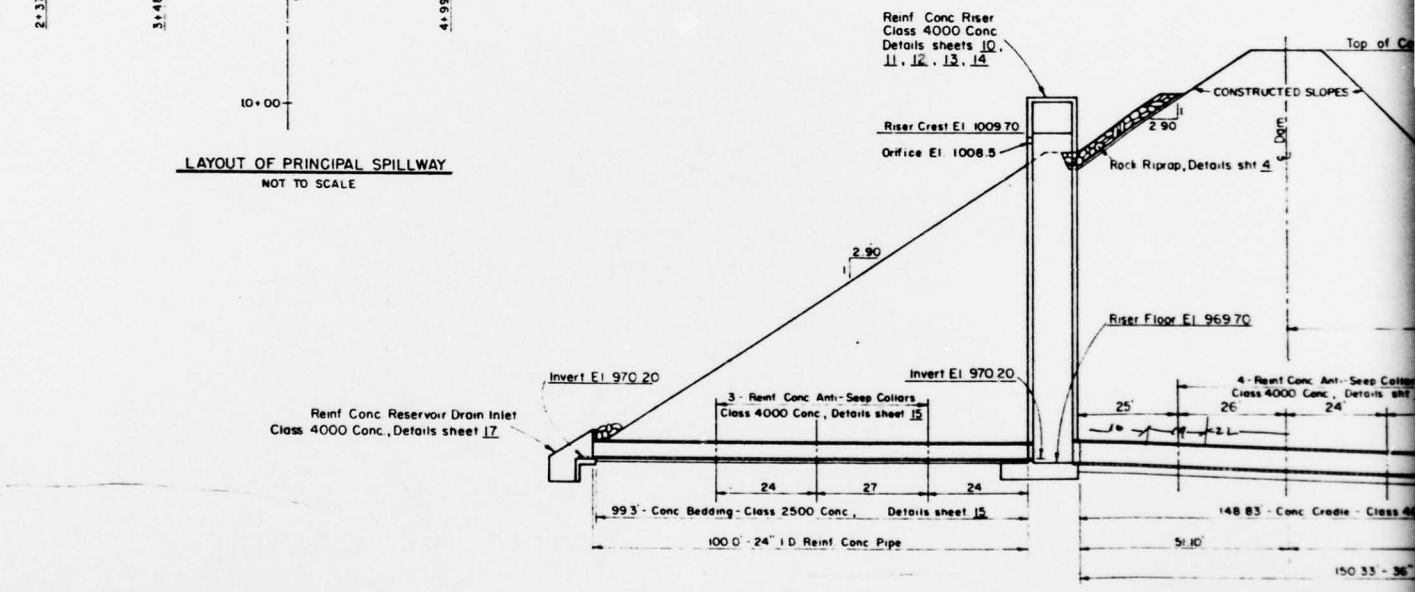


PLAN VIEW OF PRINCIPAL SPILLW

0 5 10 20 40
SCALE in FEET

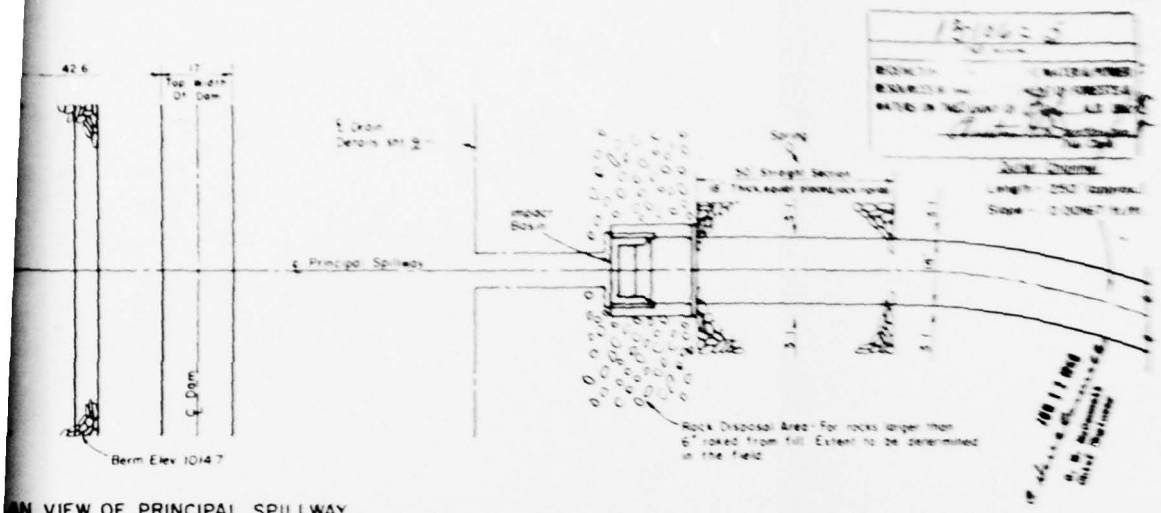


LAYOUT OF PRINCIPAL SPILLWAY
NOT TO SCALE



PROFILE ALONG ℄ OF PRINCIPAL SPILL

0 5 10 20 40 Feet
HORIZ SCALE
0 5 10
VERT SCALE



AN VIEW OF PRINCIPAL SPILLWAY

0 5 10 20 40
SCALE in FEET

36" I.D. REINFORCED CONCRETE PRESSURE PIPE SPILLWAY CONDUIT

9 - 16' Sections (Straight)
1 - 6' Section (Straight) 28'
1 - Spigot Ring Wall Fitting (For 2' wall)
1 - 20' Sections (Straight)
1 - 10' Section (Straight)
1 - Spigot Ring Wall Fitting (For 3' wall)

Max. Pressure head = 48', Min. pressure head = 0'
Load = 56,065 Lbs per lin ft based on O.D of 3.67'
Min. 3 edge bearing strength for
0.01" Crack non-prestressed pipe = 19,000 lbs. per lin. ft
0.001" Crack prestressed pipe = 14,300 lbs. per lin. ft

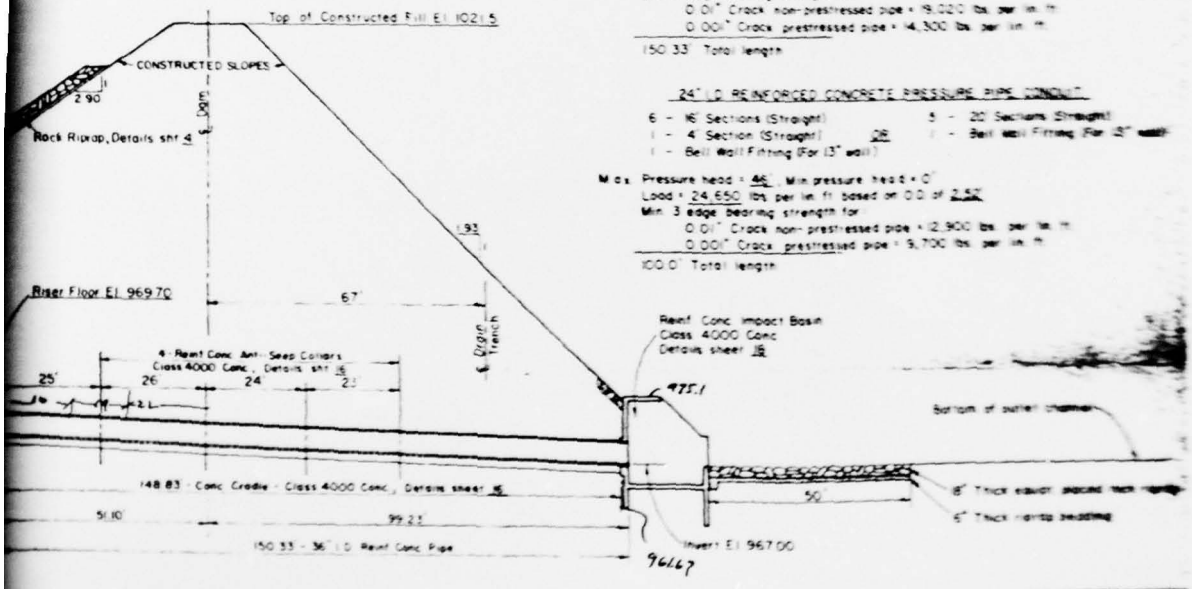
150.33' Total length

24" I.D. REINFORCED CONCRETE PRESSURE PIPE CONDUIT

6 - 16' Sections (Straight)
1 - 4' Section (Straight) 28'
1 - Bell Wall Fitting (For 3' wall)
5 - 20' Sections (Straight)
1 - Bell wall Fitting (For 2' wall)

Max. Pressure head = 46', Min. pressure head = 0'
Load = 24,650 lbs per lin ft based on O.D of 2.52'
Min. 3 edge bearing strength for
0.01" Crack non-prestressed pipe = 12,900 lbs. per lin. ft
0.001" Crack prestressed pipe = 9,700 lbs. per lin. ft

100.0' Total length



LE ALONG ℄ OF PRINCIPAL SPILLWAY

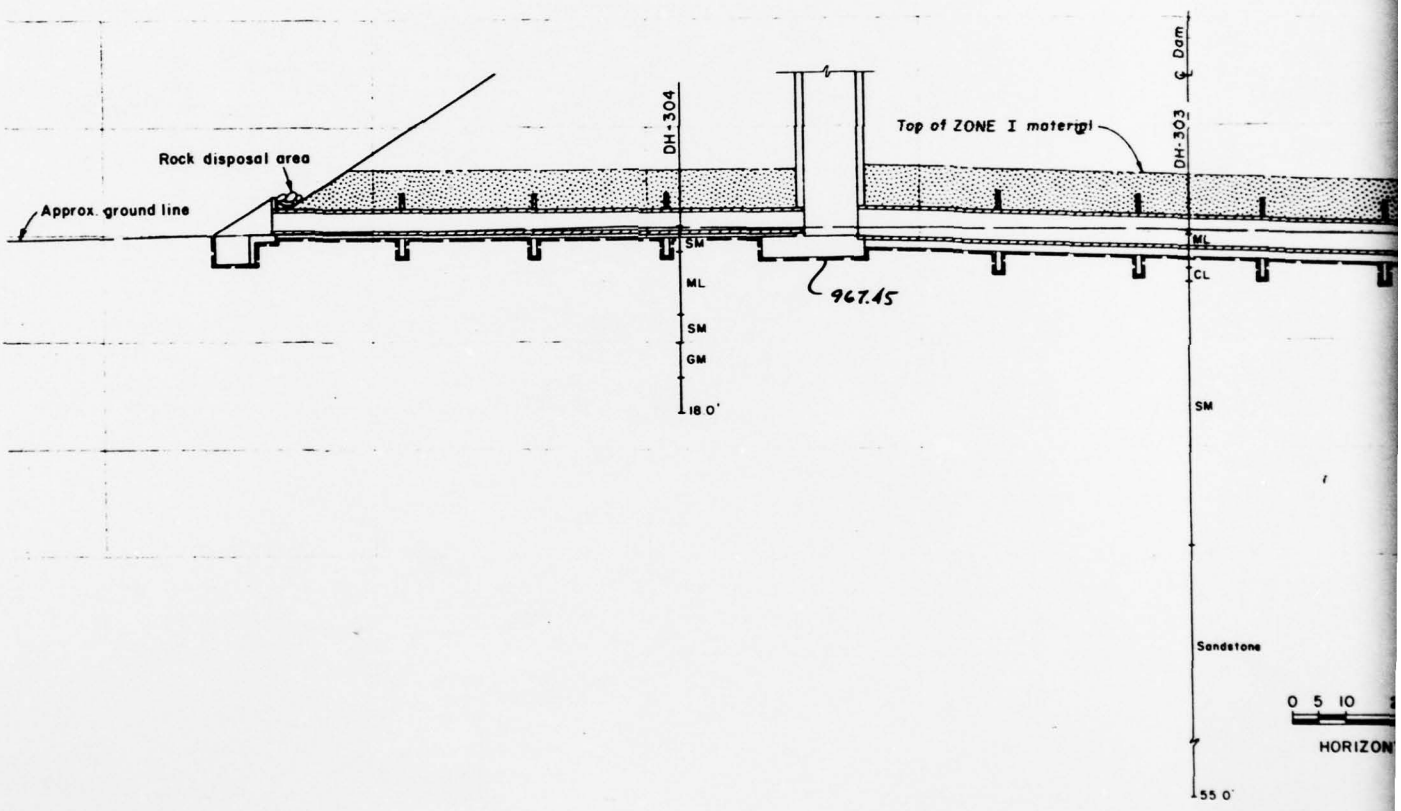
20 40 Feet
RIZ SCALE
0 5 10 20 Feet
VERT SCALE

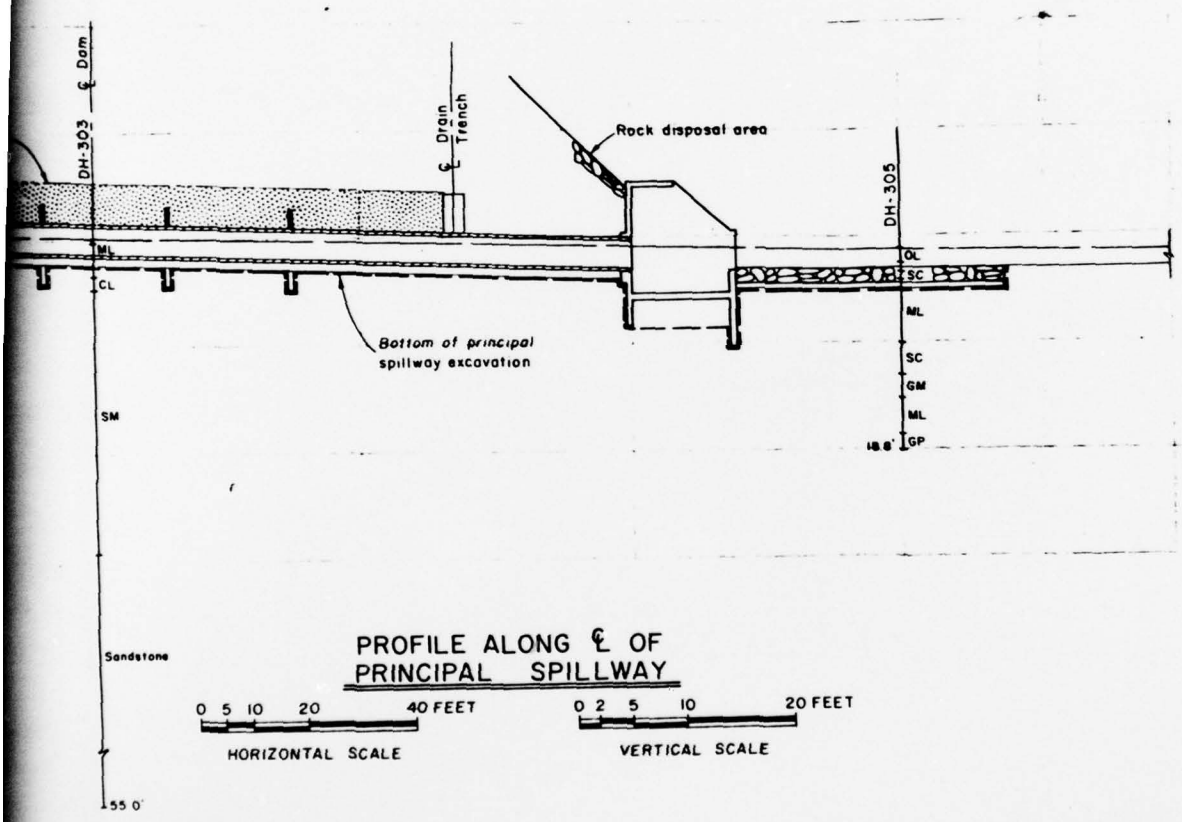
PRINCIPAL SPILLWAY
MAUCH CHUNK LAKE DAM

NAT. ID NO. PA.00605 CARBON COUNTY

DATA OBTAINED FROM U.S. DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-482-P, SHEET NO. 5 OF 27, DATED MARCH, 1967

PLATE 5


Rock disposal area
Approx. ground line
DH-304
Top of ZONE I material
℄ Dam
DH-303
967.15
SM
ML
SM
GM
18.0'
ML
CL
SM
Sandstone
55.0'
0 5 10
HORIZON



PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

0 5 10 20 40 FEET
HORIZONTAL SCALE

0 2 5 10 20 FEET
VERTICAL SCALE

2

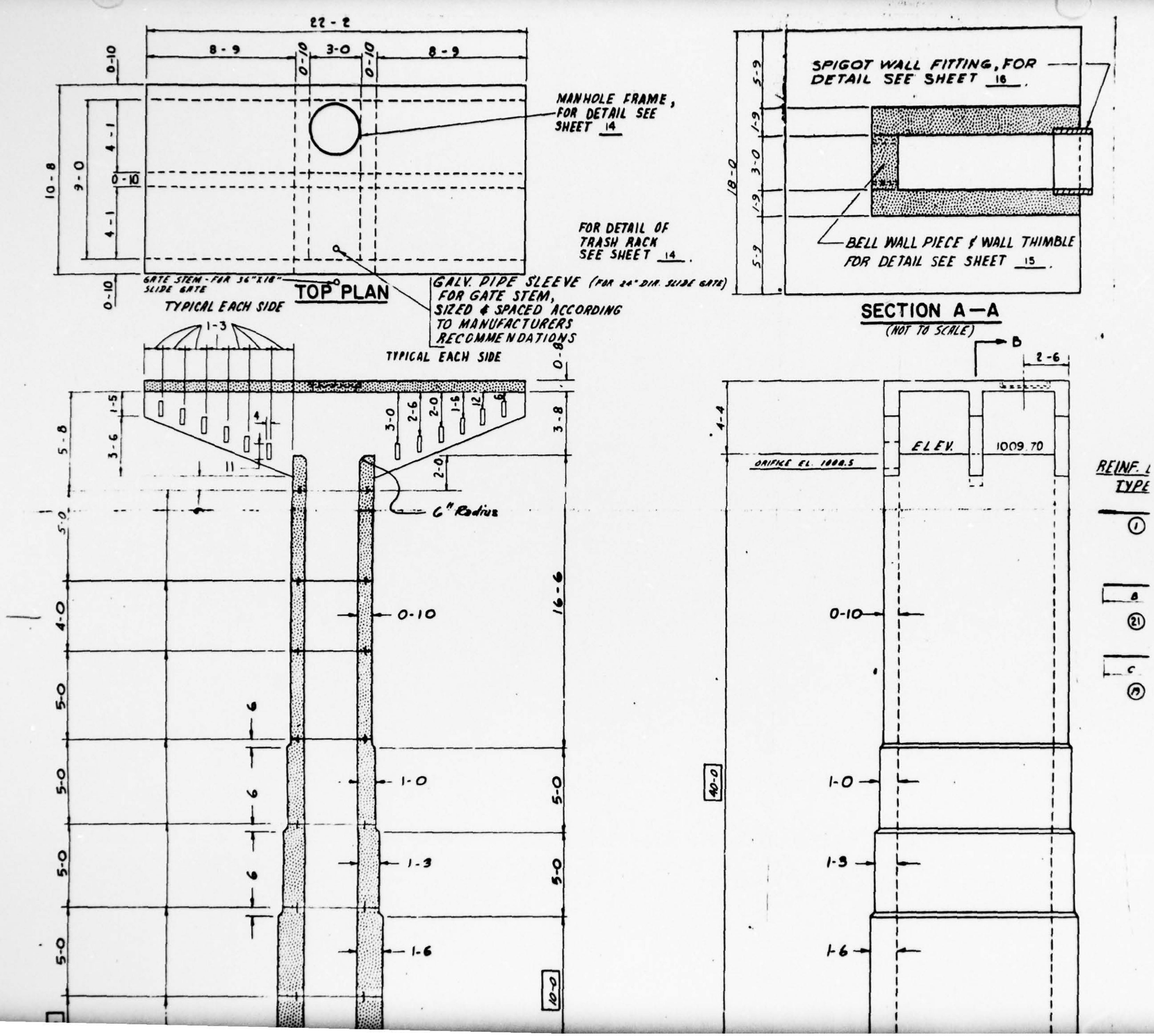
PRINCIPAL SPILLWAY CONSTRUCTION DETAILS

MAUCH CHUNK LAKE DAM

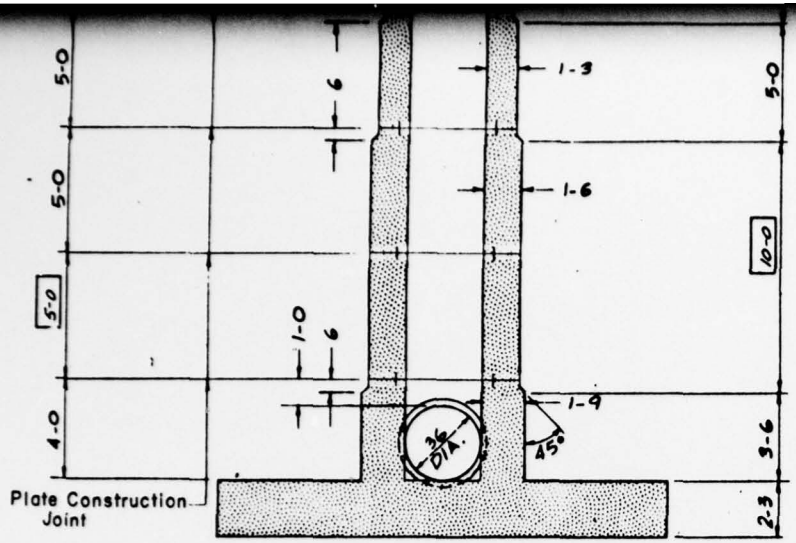
NAT. ID NO. PA.00605 CARBON COUNTY

DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE , DRAWING NO. PA-462-P, SHEET NO. 6 OF 27, DATED MARCH, 1967

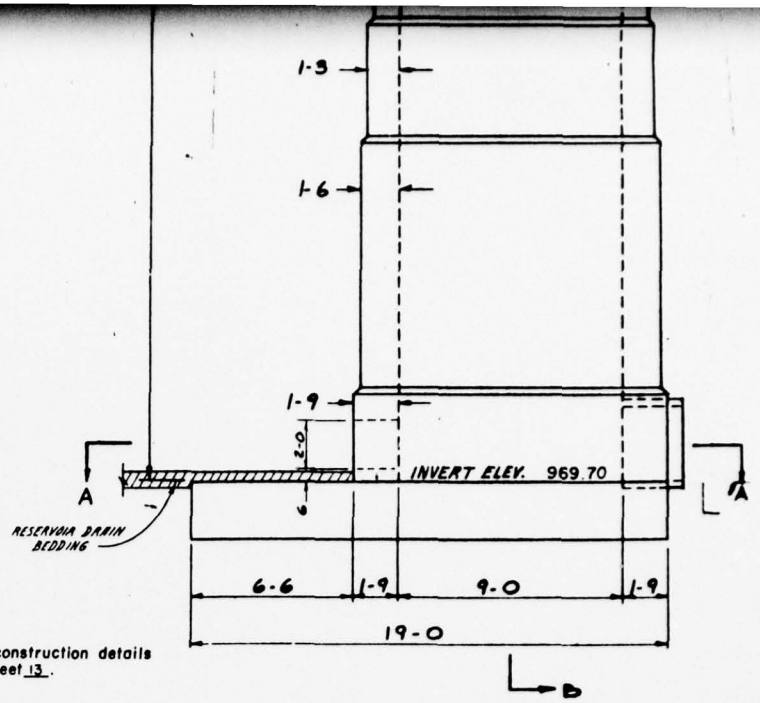
PLATE 6



MANHOLE FRAME, FOR DETAIL SEE SHEET 14
FOR DETAIL OF TRASH RACK SEE SHEET 14.
GATE STEM - FOR 36"X18" SLIDE GATE
TOP PLAN
GALV. PIPE SLEEVE (FOR 24" DIA. SLIDE GATE) FOR GATE STEM, SIZED & SPACED ACCORDING TO MANUFACTURERS RECOMMENDATIONS
TYPICAL EACH SIDE
TYPICAL EACH SIDE
6" Radius
SPIGOT WALL FITTING, FOR DETAIL SEE SHEET 16.
BELL WALL PIECE & WALL THIMBLE FOR DETAIL SEE SHEET 15.
SECTION A—A
(NOT TO SCALE)
B
ELEV. 1009.70
ORIFICE EL. 1000.5
REINF. TYPE
22 - 2
8 - 9
3-0
10 - 8
9 - 0
4 - 1
18-0
5-9
1-9
40-0
16-6
10-0



SECTION B-B

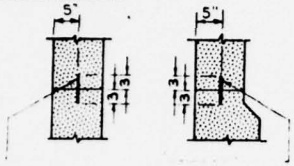


NOTE: For construction details see sheet 13.

SIDEWALL ELEVATION

0 1 2 3 4 8
Scale in ft

1/4" x 6" Steel Plate, Continuous Thru Constr Joint Splices Shall Be Either:
1. Butt Welded



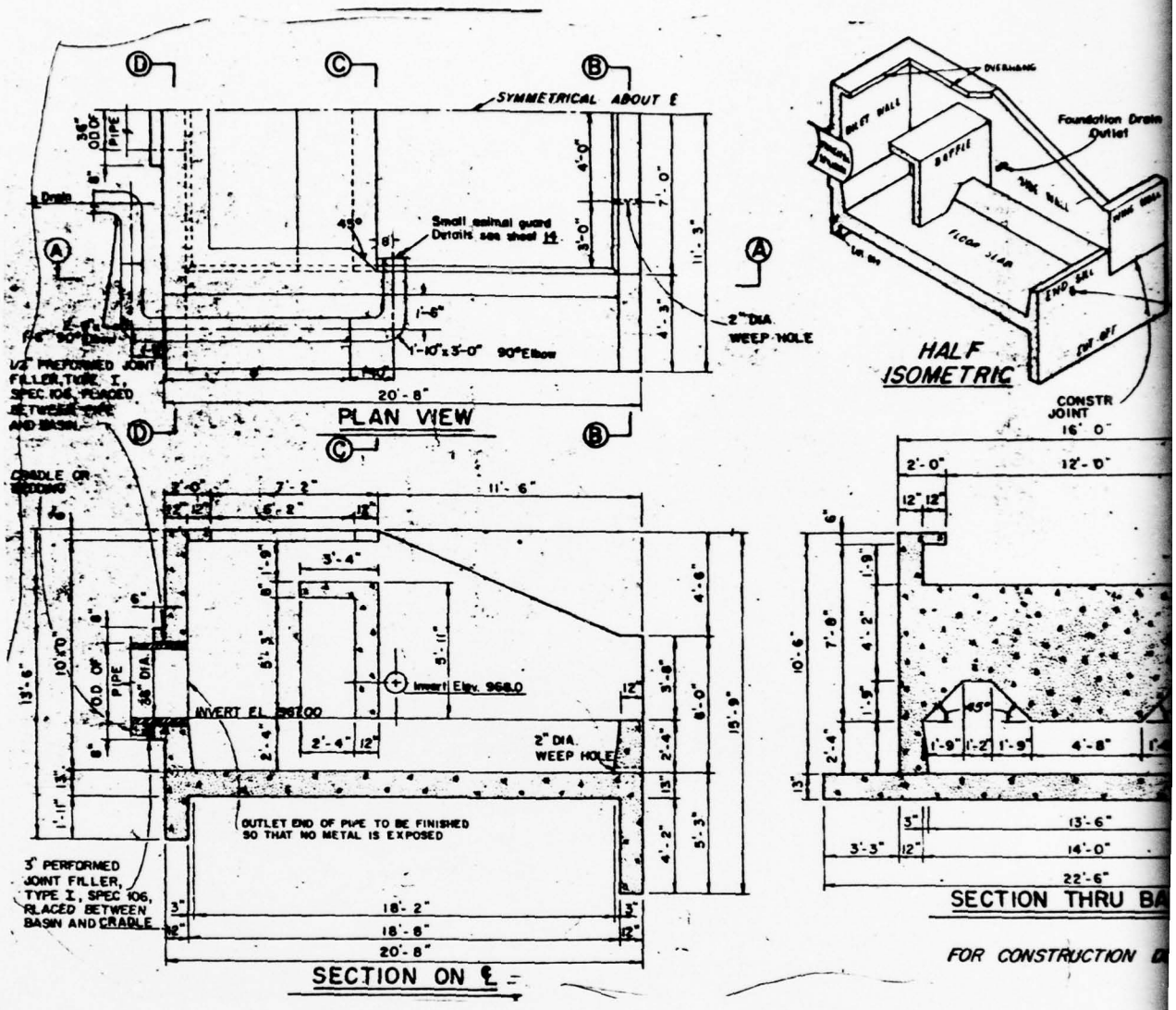
ATE CONST'R. JOINT

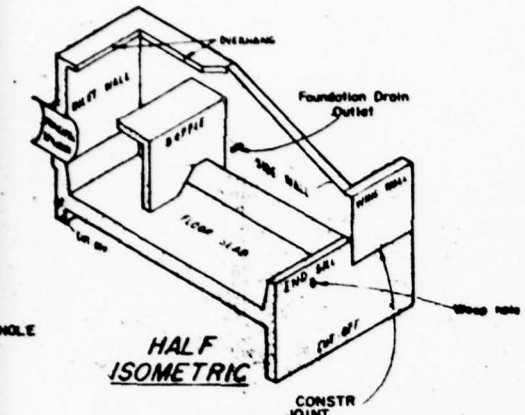
RISER STRUCTURE DETAILS
MAUCH CHUNK LAKE DAM
NAT. ID NO. PA.00605 CARBON COUNTY

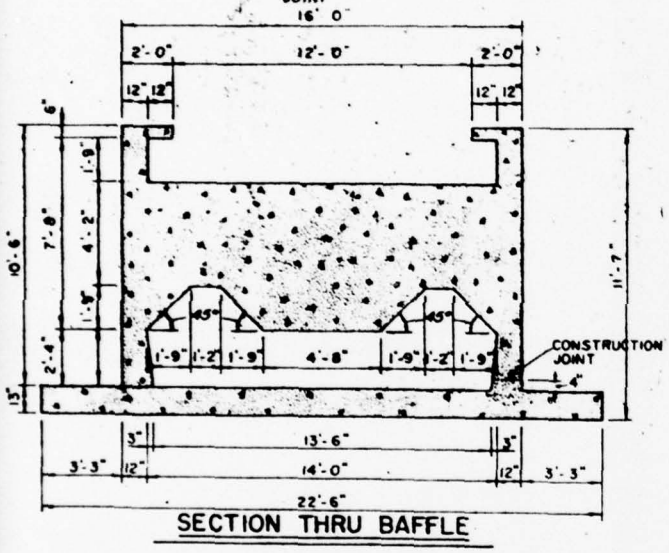
DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO.10 OF 27, DATED MARCH, 1967

PLATE 7

9


SYMMETRICAL ABOUT ℄
Small animal guard Details see sheet 14
2" DIA. WEEP HOLE
1-10"x3-0" 90° Elbow
20'-8"
PLAN VIEW
Invert El. 968.0
INVERT EL. 968.00
OUTLET END OF PIPE TO BE FINISHED SO THAT NO METAL IS EXPOSED
3" PERFORMED JOINT FILLER, TYPE I, SPEC 106, PLACED BETWEEN BASIN AND CRADLE
18'-2"
18'-8"
20'-8"
SECTION ON ℄
HALF ISOMETRIC
Foundation Drain Outlet
BAFFLE
FLOOR SLAB
CONSTR JOINT
16'-0"
12'-0"
13'-6"
14'-0"
22'-6"
SECTION THRU BA
FOR CONSTRUCTION



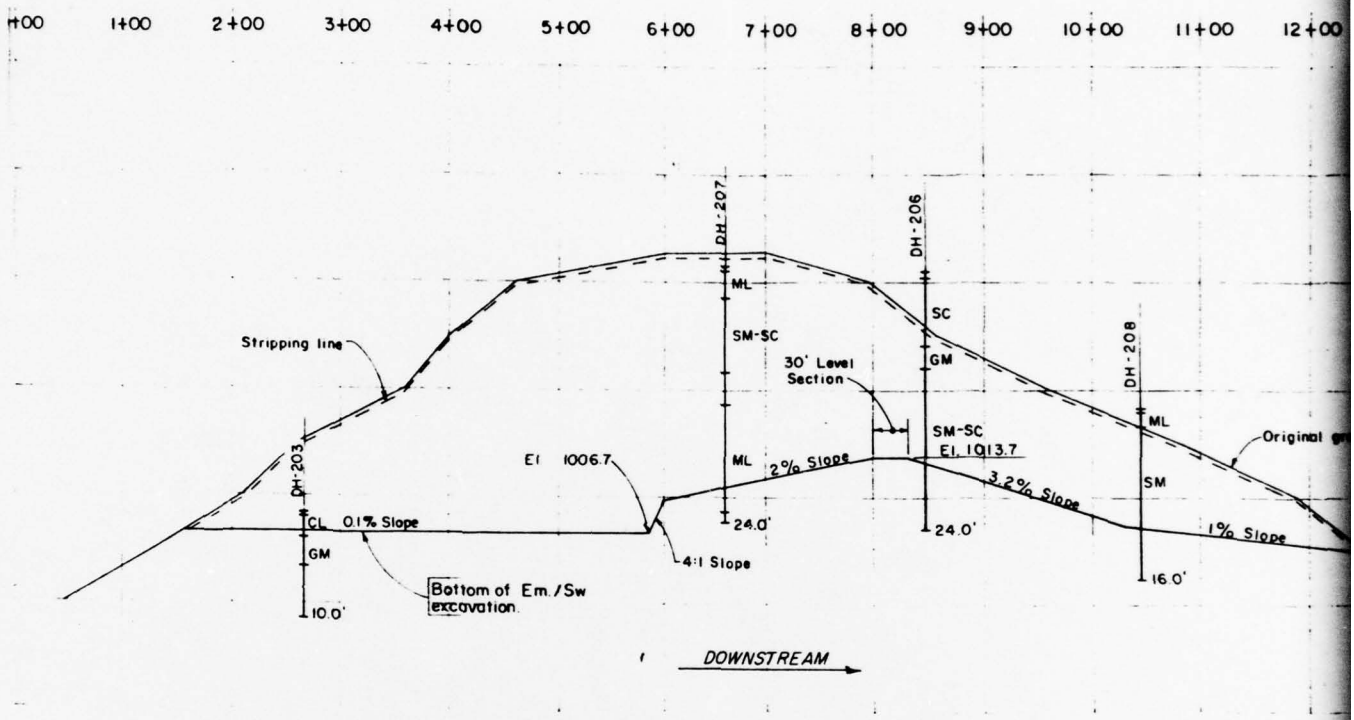


SECTION THRU BAFFLE

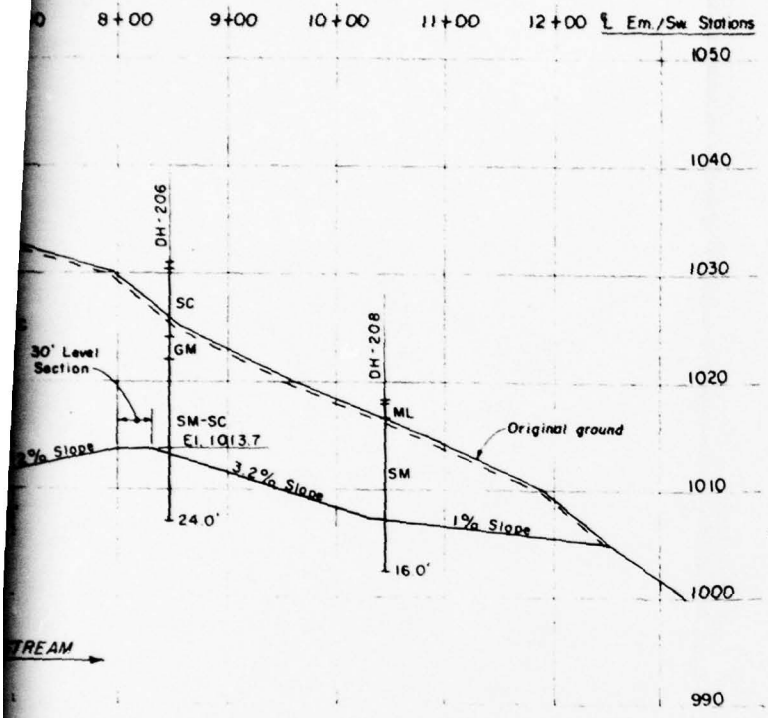
FOR CONSTRUCTION DETAILS.

2

IMPACT BASIN DETAILS MAUCH CHUNK LAKE DAM	
NAT. ID NO. PA.00605	CARBON COUNTY
DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO.18 OF 27, DATED MARCH, 1967	
	PLATE 8



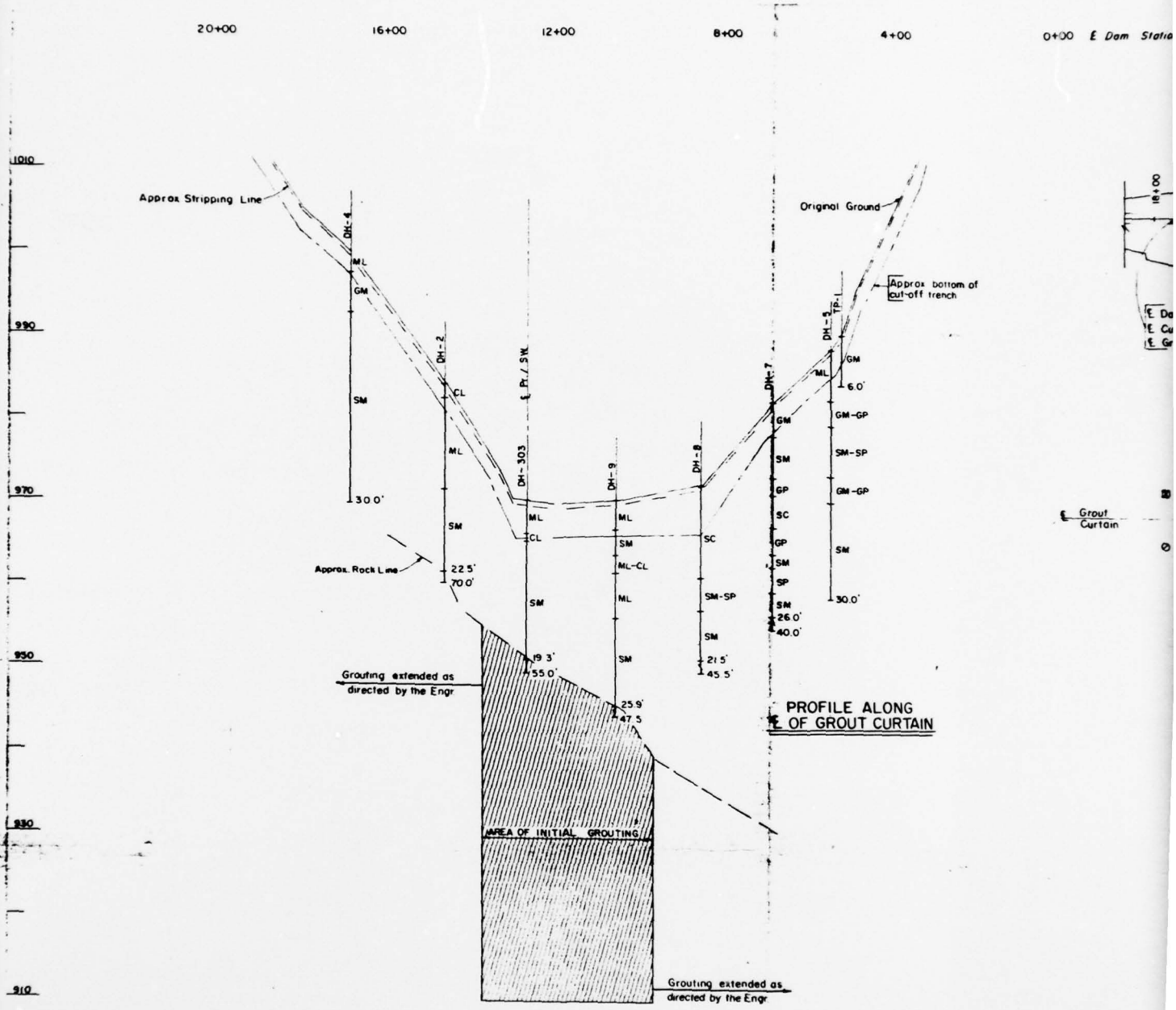
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY



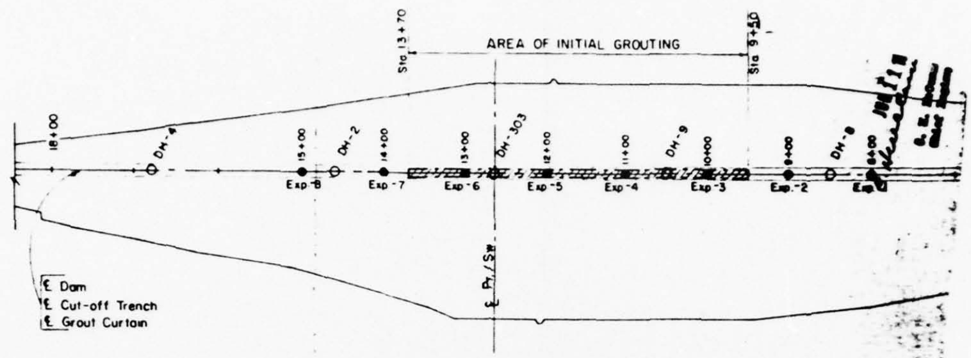
ERGENCY SPILLWAY

2

PROFILE ALONG CENTERLINE OF EMERGENCY SPILLWAY MAUCH CHUNK LAKE DAM		
NAT. ID NO. PA.00605		CARBON COUNTY
DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO. 6 OF 27, DATED MARCH, 1967		
		PLATE 9


20+00
16+00
12+00
8+00
4+00
0+00
E Dam Statio
1010
990
970
950
930
910
Approx Stripping Line
Original Ground
Approx bottom of cut-off trench
Approx. Rock Line
Grouting extended as directed by the Engr
AREA OF INITIAL GROUTING
Grouting extended as directed by the Engr
PROFILE ALONG
℄ OF GROUT CURTAIN
℄ Grout Curtain
DH-4
DH-2
DH-303
DH-9
DH-8
DH-7
DH-5
TP-1
ML
GM
SM
30.0'
CL
22.5'
70.0'
19.3'
55.0'
ML-CL
SC
SM-SP
21.5'
45.5'
25.9'
47.5'
GP
SP
26.0'
40.0'
GM-GP
SM-SP
6.0'

0+00 ℄ Dam Stations



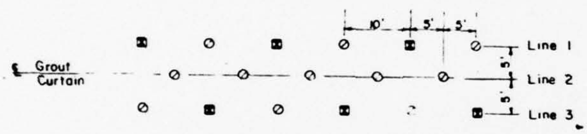
PLAN VIEW OF GROUT CURTAIN

0 25 50 100 200

SCALE in FEET

LEGEND

Symbol	Description
▣	Primary Hole
⊘	Secondary Hole
● Exp	Exploratory Drill Hole
O_{DH}	Geology Drill Hole
$\square_{TP}$	Geology Test Pit



GROUT HOLE DRILLING PATTERN

NOT TO SCALE

CONSTRUCTION DETAILS

1. Exploratory holes no. 1, 2, 7 & 8 shall be drilled early in the grouting work to help establish the need for extension of the grout curtain
2. Drilling the grout holes will be done by the split spacing method. All grout hole drilling and grouting shall be accomplished on lines 1 & 3 before any grout hole drilling and grouting is done on line 2. The need for grouting line 2 will be determined by the Engineer based on results of pressure tests & grout take in exploratory holes no. 3, 4, 5 & 6 or at other locations designated by the Engineer & drilled after completion of the grouting on [illegible]
3. In general, stage grouting will be used to establish the grout curtain.
4. Primary & secondary holes will generally be drilled to the [illegible]
5. Depth and extent of grout curtain shown is approximate. Actual [illegible] determined after examination of conditions encountered.
6. Cement shall be type I.
7. At the Contractor's option, drilling for exploration or grouting may be started at or above the bottom of the cutoff trench except that within 30' of the principal spillway the grouting operation shall be completed prior to fill placement above the principal spillway conduit. Pay limits will be as defined by Spec. 215

GROUTING DETAILS MAUCH CHUNK LAKE DAM	
NAT. ID NO. PA.00605	CARBON COUNTY

DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO. 8 OF 27, DATED MARCH, 1967

PLATE 10

LEGEND

TEST HOLE NUMBERING SYSTEM

Centerline of dam	1 — 99
Borrow area	101 — 199
Emergency spillway	201 — 299
Centerline of outlet structure	301 — 399
Stream channel	401 — 499
Relief wells	501 — 599
	601 — 699
	701 — 799

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW	Well graded gravels, gravel-sand mixtures
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sands; sand-gravel mixtures
SP	Poorly graded sands
SM	Silty sands; sand-silt mixtures
SC	Clayey sands, sand-clay mixtures
ML	Silts, silty, very fine sands, sandy or clayey silts
CL	Clays of low to medium plasticity; silty, sandy or gravelly clay
CH	Clays of high plasticity; fat clays
MH	Elastic silts; micaceous or diatomaceous silts
OL	Organic silts and organic silty clays of low plasticity
OH	Organic clays or silts of medium to high plasticity

BEDROCK SYMBOLS

B	Basalt	Sc	Schist
Gn	Gneiss	Sh	Shale
Gr	Granite	Si	Siltstone
Ls	Limestone	Sl	Slate
Mo	Marble	Ss	Sandstone

SAMPLES

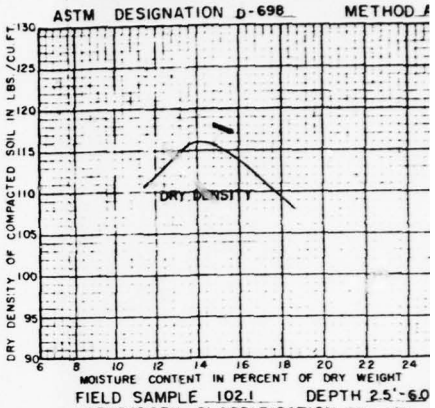
DS	Disturbed
US	Undisturbed

NOTE:
All soil and rock classification were determined by visual examination. The percentage of gravel, sand, and fines in the matrix are estimated on the basis of 100% passing three inches.

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2936

ASTM DESIGNATION D-698 METHOD A



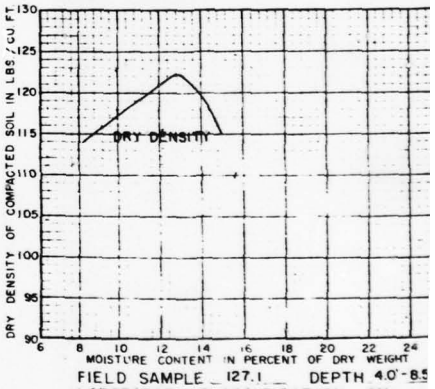
FIELD SAMPLE 102.1 DEPTH 2.5'-6.0

LABORATORY CLASSIFICATION SM or ML

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2937

ASTM DESIGNATION D-698 METHOD A



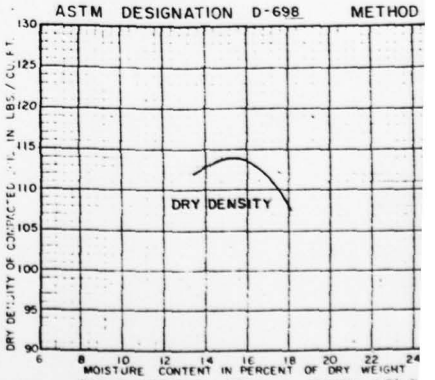
FIELD SAMPLE 127.1 DEPTH 4.0'-8.5

LABORATORY CLASSIFICATION SM

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2935

ASTM DESIGNATION D-698 METHOD



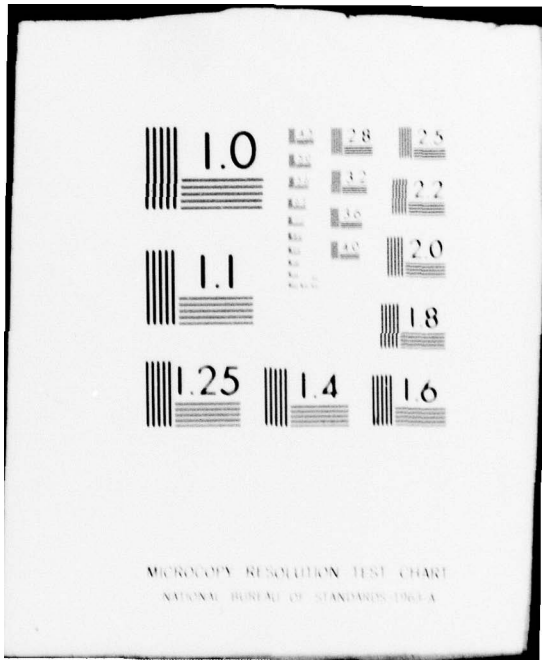
FIELD SAMPLE 205.1 DEPTH 1.0'-2

LABORATORY CLASSIFICATION ML

AD-A068 643 WOODWARD-CLYDE CONSULTANTS PLYMOUTH MEETING PA F/G 13/2
NATIONAL DAM INSPECTION PROGRAM. MAUCH CHUNK LAKE DAM (PA00605)--ETC(U)
SEP 78 DACW31-78-C-0048
UNCLASSIFIED NL

2 OF 2
AD
A068643

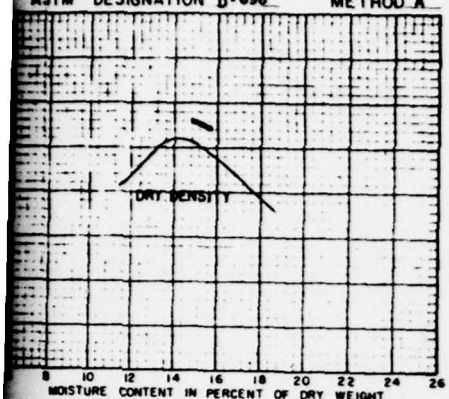
END
DATE
FILMED
6-79
DDC


1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2936

ASTM DESIGNATION D-698 METHOD A



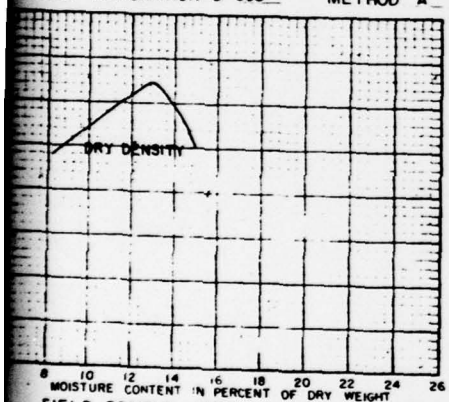
FIELD SAMPLE 102.1 DEPTH 2.5'-6.0'

LABORATORY CLASSIFICATION SM or ML

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2937

ASTM DESIGNATION D-698 METHOD A



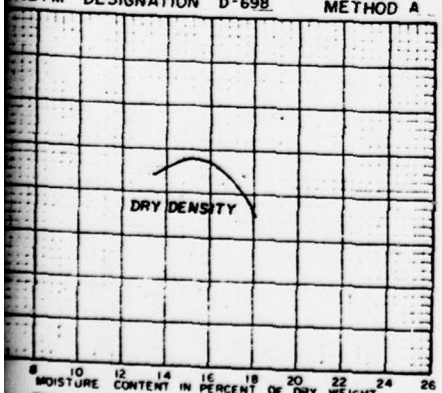
FIELD SAMPLE 127.1 DEPTH 4.0'-8.5'

LABORATORY CLASSIFICATION SM

COMPACTION CURVE

LABORATORY SAMPLE NO. 66W2935

ASTM DESIGNATION D-698 METHOD A



FIELD SAMPLE 205.1 DEPTH 1.0'-2.5'

LABORATORY CLASSIFICATION ML

2

COMPACTION DATA

MAUCH CHUNK LAKE DAM

NAT. ID NO. PA.00605 CARBON COUNTY

DATA OBTAINED FROM U.S.DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, DRAWING NO. PA-462-P, SHEET NO.24 OF 27, DATED MARCH, 1967

PLATE 11

APPENDIX

F

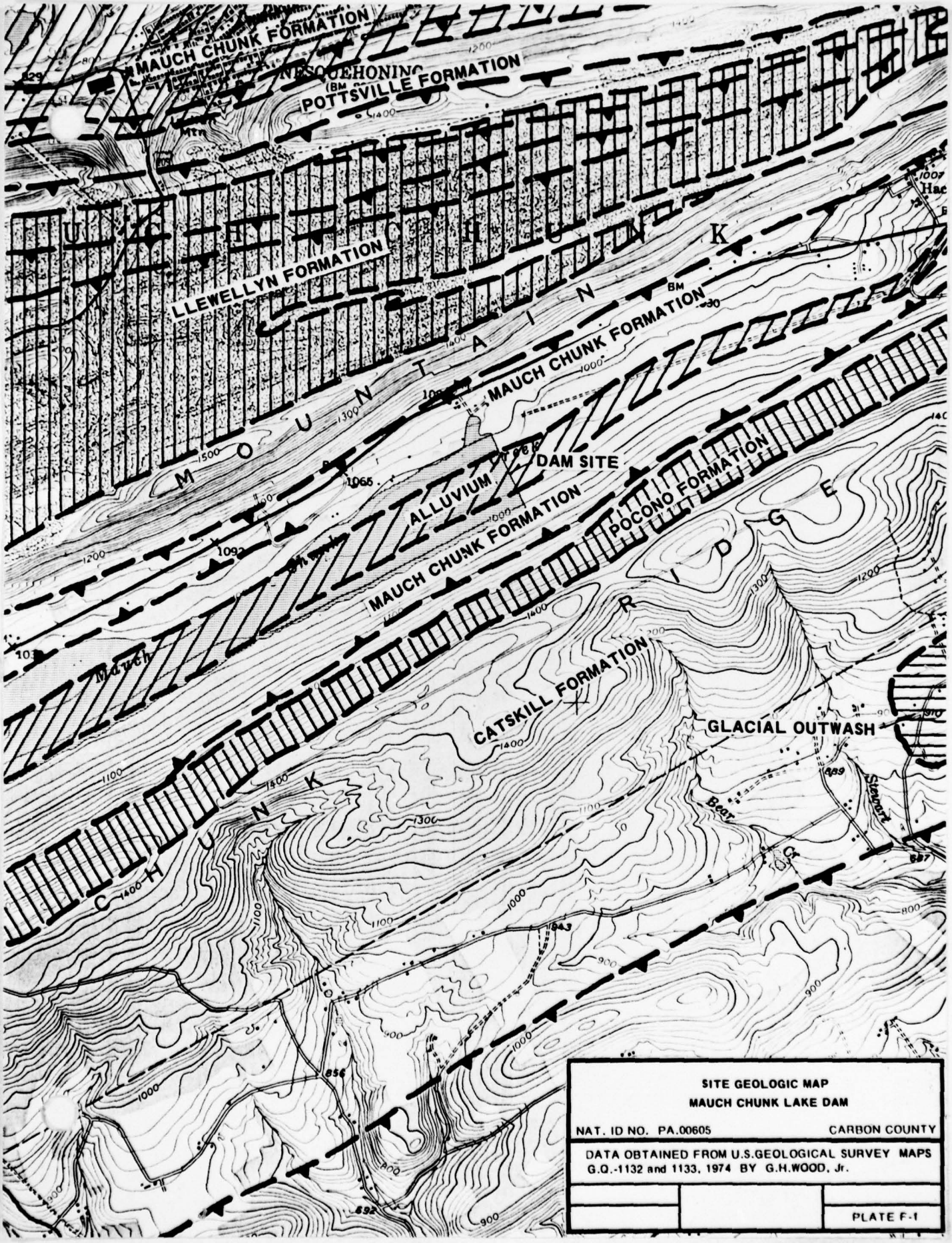
SITE GEOLOGY
MAUCH CHUNK CREEK DAM

Mauch Chunk Creek Dam is located in the Appalachian Mountain section of the Valley and Ridge Physiographic Province. The bedrock at the dam site is reported to consist of the red and brown sandstones, siltstones and shales of the Mississippian Mauch Chunk Formation (see Plate F-1). The Mauch Chunk Formation is bounded to the northwest by the sandstones and conglomerates of the Pennsylvanian Pottsville Formation and to the southeast by the sandstones, siltstones and shales of the Devonian Catskill Formation. Bedding strikes to the northeast and dips to the northwest (Wood, 1974). Two open, variably spaced sets of joints have been reported in the area: one set oriented approximately along the strike of bedding with variable dips ranging from 53° SE to 65° NW, and a second set striking to the northwest with a near vertical dip (Wood, 1974). No faults have been mapped beneath the dam or the reservoir, although thrust faults on either side of the Mauch Chunk Creek valley, striking parallel to the reservoir have been observed.

Downstream seepage should not be a major problem unless the reported northeast trending (perpendicular to the dam) is well developed beneath the dam structure.

References:

1. *Wood, G.H., 1978, Geologic Map of the Nesquehoning Quadrangle, Carbon and Schuylkill Counties, Pennsylvania: USGS Geologic Map GQ-1132, 1:24,000.*



SITE GEOLOGIC MAP
MAUCH CHUNK LAKE DAM

NAT. ID NO. PA.00605 CARBON COUNTY

DATA OBTAINED FROM U.S.GEOLOGICAL SURVEY MAPS
G.Q.-1132 and 1133, 1974 BY G.H.WOOD, Jr.

PLATE F-1